# SUPPLEMENT.


# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

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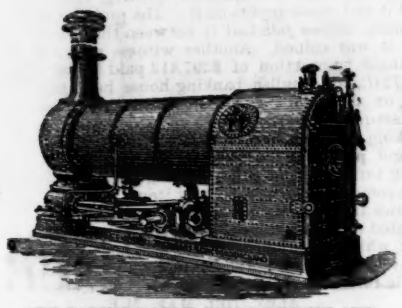

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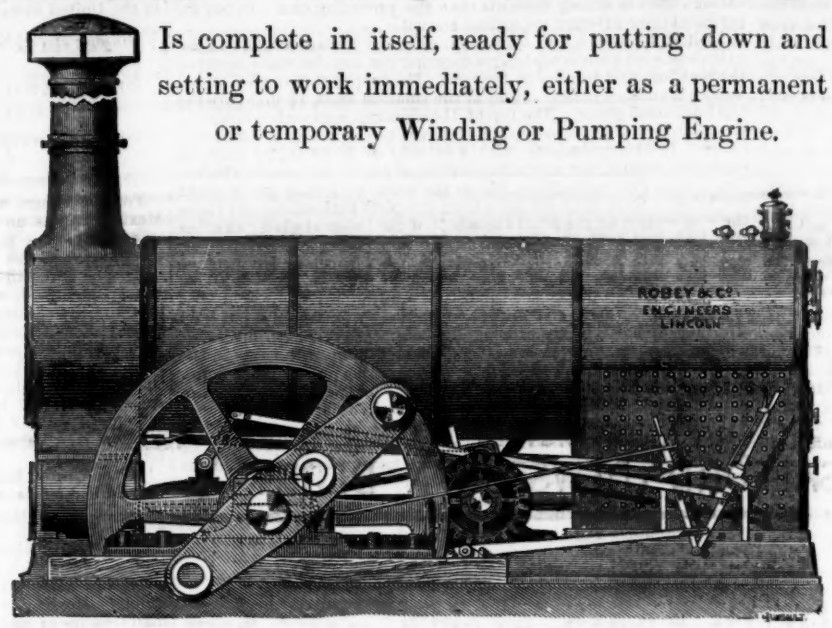


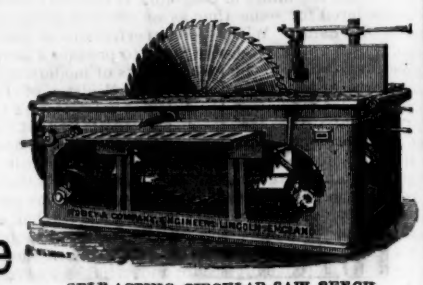

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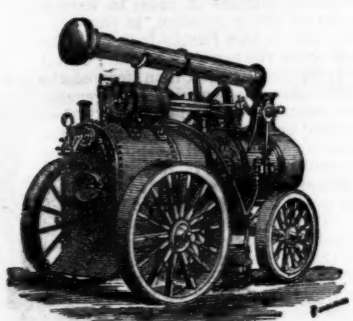

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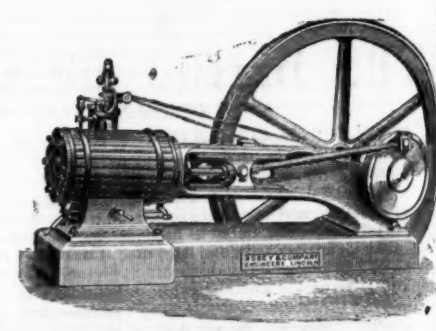

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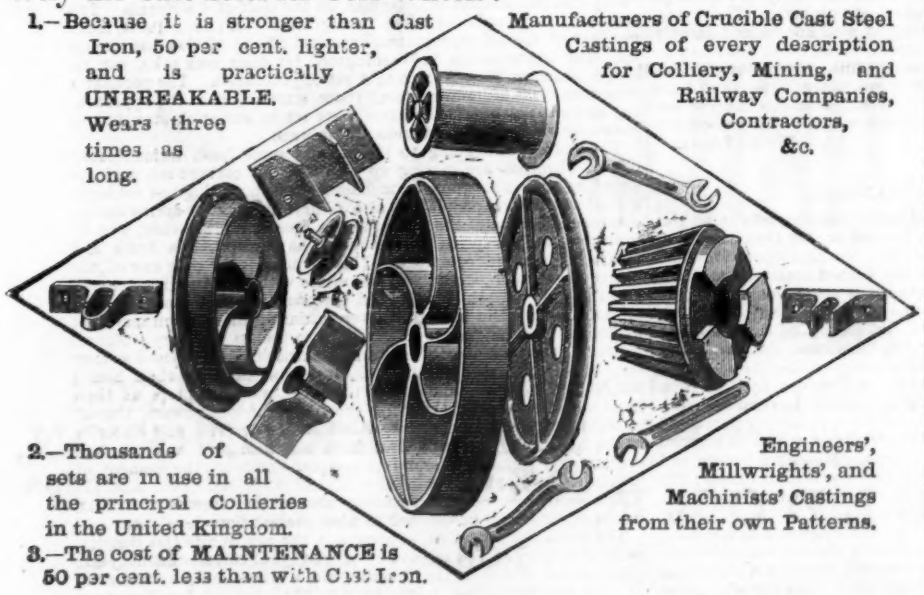

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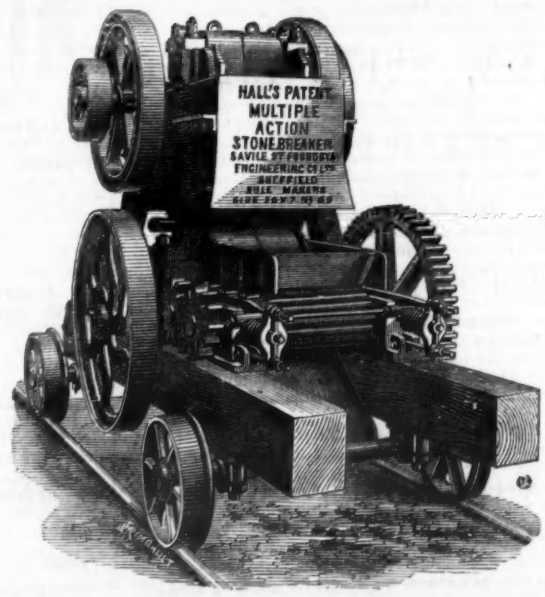


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### SAFETY-LAMPS—EXPERIMENTS WITH THE MUESELER TYPE OF LAMPS IN BELGIUM.

SIR,—Shortly after the invention of the Davy lamp in 1815 it was introduced into the mines of Belgium. It became extensively used, and was considered for some time as an efficient protection from explosions of fire-damp. When the imperfections of this lamp became better known endeavours were made to produce a lamp more reliable and better adapted to the requirements of modern mining. A Commission was appointed in 1840 by the Minister of Public Works in Belgium to make trials of the different safety-lamps then utilised on the Continent. The conclusion arrived at by this Commission was that the lamp introduced by a Belgian mining engineer—the late M. Muesseler, in the same year—combined the requisite conditions for a mining lamp above all the others submitted to their examination. In 1851 the Mueseler lamp, with some others, was permitted by the Government to be used in fiery mines until further experience was acquired with them, and the relative merits of each became better known. In 1864, after this further experience of the Mueseler lamp, its character as the most secure and reliable was affirmed, and its use was made compulsory in all fiery mines. Since that time the Government have been requested to test other new lamps with a view to their introduction in fiery mines, some of the new lamps using mineral oil for feediug. In consequence another Commission was appointed in 1868. After numerous experiments they reported that the Mueseler lamp fed with vegetable oil was superior to all others, and that this and the Mueseler-Godin, and the Deputy's testing lamp, should be the only lamps admitted for lighting fiery mines. It was decided by this Commission that from the nature of mineral oil and its variable composition it was unfit for use in such mines.

The Mueseler lamp is a modification of the English Clanny lamp, the distinguishing features of the former being the addition of a horizontal gauze at the top of the glass cylinder, and a metallic chimney narrowed at the top to a maximum of ·394 inch. It will be seen on a further perusal of this paper that the experiments of the Commission of 1868, interrupted in that year, and resumed again in 1872, were principally performed on lamps of the Mueseler type; a few experiments were made with the Davy lamp, but none are recorded as being made on the Stephenson lamp, or any modification of it.

Taken altogether the experiments proved that none of the lamps were safe under all conditions. With respect to the Davy and Deputy lamps, it was known from the first that they were unsafe in explosive mixtures travelling at a velocity of 7·38 feet per second, but a Commission which recently instituted experiments at St. Etienne affirmed that these lamps were unsafe in explosive mixtures moving at a speed of 5·576 feet per second, the gauze in the latter case having 1354 apertures to the square inch, and wire ·01 inch in diameter.

In the Belgian experiments, which terminated in 1872, the Mueseler lamp, though the most highly approved, in many cases produced explosions, the causes of which could not be clearly seen. Varying the proportion of gas in the explosive mixture, greasing the horizontal gauze, swinging the lamp, and causing an ascending current to play on the lamp, each of these conditions proved to be a cause of explosion. Of all the lamps of the Mueseler type submitted to the tests the Mueseler-Joassin proved the best; it failed only when ascending whirling currents, together with variable mixtures, were applied to it.

The following is an abstract of the experiments made by the Belgian Commission of 1868—its report was published in the year 1873. The decrees and report have been translated by Mr. C. G. Jackson, and presented to the North of England Mining Institute. The Commission, as they acquired experience as to the essential requirements of a safety-lamp, endeavoured to produce modifications in detail of the Mueseler lamp. These, and the modifications of other inventors, consisted principally in substituting two inclined gauzes for the horizontal gauze, or one inclined gauze in addition to the horizontal; and in varying the diameter of the top of the chimney, the shape at its base, and the distance from its base to the wick-tube.

THE DAVY AND DEPUTY LAMP.—The latter, probably the Clanny lamp, is used as a testing lamp. The Commission observes on these lamps that they do not explode in a mixture moving 4·264 ft. per second. When the velocity reaches 7·38 ft. per second the explosion is always passed through to the outside. They do not seem to have determined at what velocity between the two quoted an explosion would first ensue. At the speed of 19·68 ft. per second the explosion was sometimes instantaneous. In these experiments it was noted that the gauzes made with a small mesh and of thick wire resisted the passage of explosions more effectually than those with a large mesh and of thin wire. The lamps experimented on appear to have been fitted with gauze of 1354 meshes to a square inch.

MUESELER LAMP.—The dimensions of the principal parts of the standard lamp are as follows:—The glass cylinder, exterior diameter, 2·364 in.; thickness, ·216 in.; height, not more than 2·442 in. The cylinder is fitted at the ends into metallic sockets. The chimney of thin iron; interior diameter at the top not more than ·394 in.; at the base 1·182 in.; at the top of the bell-shape, ·985 in. Height of the chimney above the horizontal gauze, 3·546 in.; height under the same, including the bell-mouth, 1·063 in.; height of the bell-mouth, ·236 in. Distance from the chimney to the top of the wick-tube, ·866 in. The wire-gauze for the cylindrical cap and horizontal gauze is composed of wires at least ·013 in. diameter, with a minimum of 928 meshes to a square inch. In 226 experiments with this lamp made by the Commission there were 111 at velocities of 11·48 ft., producing two exterior explosions, and three cases of passage of the flame into the cylinder; and at 14·76 ft. nine explosions, two of which were effected by inclined currents and varying mixtures. The 115 other experiments were in velocities near 19·68 ft. per second, giving 13 explosions on the outside, and two cases of passage of flame into the cylindrical cap. It was noticed in the experiments that in explosive currents, at a velocity under 9·84 ft., complete extinction of the wick and gas only takes place. When this velocity is exceeded combustion of the gaseous mixture generally takes place under the horizontal gauze, continuing to burn after the wick is extinguished. No explosion, however, resulted from this circumstance.

MUESELER-THONARD LAMP.—Sixty-four experiments were made with these lamps at a velocity of 19·68 ft., giving three explosions and three cases of simple inflammation of gas in the gauze cylinder. The Thonard lamp is furnished with a truncated cone of copper, open at the top, and placed above the horizontal cause, designed to break the force of currents. In 64 experiments the lamp was completely extinguished eight times, but the combustion of gas under the horizontal gauze is most active.

MUESELER-JOASSIN LAMP (No. 1).—This modification consists of a conical wire gauze fixed to the horizontal gauze at the bottom, and to the chimney at the upper side at a height of 1¼ in., which offers a further impediment to the passage of flame into the gauze cylinder. In 82 experiments there were only two cases of inflammation, and these of passage of flame into the cylinder. One lamp resisted all the conditions of varying mixtures, of oscillation, and of the duration of the experiment to five or six minutes. From the variety of the experiments these lamps were subjected to, they were deemed the safest and most to be relied upon.

MUESELER-DEMANET.—This lamp has also a conical wire gauze, but inverted, being placed under the horizontal gauze, and fixed to the chimney at a distance of ·708 in. below it. The Commission made 43 experiments with this lamp at a velocity of 19·68 ft. under varied circumstances. Only one explosion to the exterior resulted, but the lamp was much subject to total extinctions, 25 occurring in 43 experiments.

THE MUESELER-JOASSIN (No. 2 LAMP) combines the two foregoing, having a cone above and below the horizontal gauze. In nine experiments at 19·68 ft. velocity no explosion resulted, but in each case the lamp was extinguished.

MUESELER-GODIN G. LAMP.—In this there is a greater divergence from the Mueseler type than with the preceding lamp. The light is isolated by a truncated cone of wire gauze; the base rests on the oil receiver; the upper end fits within the metallic chimney. In 42 experiments at a velocity of 19·68 ft. no exterior explosion was produced, excepting when inclined currents, ascending or descending, were made to play upon it, and it bore all the trials of duration, oscillation, and varying mixtures without causing exterior explosion. The illuminating power of this lamp is small, but it was considered one of the safest lamps by its resisting nearly all the various causes of explosion, and the persistence with which the light continues to burn in explosive mixtures. The breaking of the Mueseler glass is rare, and without the glass the lamp is as safe as a Davy lamp when placed in explosive mixtures of a low velocity. In the Mueseler-Godin C lamp the light is also isolated, but glass is substituted for the wire gauze cone. The glass rests on a copper ring perforated with small holes.

MUESELER-ARNOULD (No. 1 LAMP).—This lamp has the metallic chimney modified, being formed of two truncated cones united at the plane of the horizontal gauze. The top of the chimney is widened out to nearly the same diameter as the gauze cylinder, and is covered by a horizontal gauze. The base is widened out so as not to curtail the passage of air between it and the glass cylinder. One lamp gave a bad light, owing to the fine mesh of the top gauze—1161 to an inch—or probably to its becoming choked with soot. In 36 experiments at a velocity of 19·68 feet, one exterior explosion ensued, and two cases of combustion in the chimney. The Arnould No. 2 lamp has a Mueseler chimney within that above described. It was less easily extinguished in strong currents than the preceding one. In ten experiments two exterior explosions ensued.

MORISON LAMP.—This is an English lamp; it consists of two glass cylinders, with a horizontal gauze covering the annular space between them at top, and another at the base. The copper chimney is formed by two truncated cones, united at the smallest ends, 1¼ in. above the top horizontal gauze. The top of the chimney approaches in size to the gauze cylinder, and within the chimney is fixed a horizontal gauze. In 11 experiments, with a velocity of 19·68 ft., no exterior explosion ensued, nor any inflammation of gas in the gauze cylinder. There were five extinctions, but as the lower horizontal gauze could not be seen these may not have been complete extinctions. At times the combustion of gas filled the whole of the internal glass; at other times it burnt at the base only.

MUESELER-JOASSIN NO. 2 LAMP, WITH TUBULAR CHIMNEY.—This consists of a modification at the top of the chimney. One specimen had a cluster of three small tubes in the interior ·196 in. diameter, 1·063 in. high, at 1 in. below the top. Another specimen had a cluster of small tubes ·130 in. diameter, ·866 in. high, placed at ·708 in. from the top. A Mueseler-Demanet lamp with tubes in the chimney was also experimented on. Each of the multitubular lamps furnished an exterior explosion in a velocity of 19·68 ft., with ascending currents. It was observed before each explosion took place that owing to the position of the lamp the flame was seen to vacillate greatly, or to be pressed downwards, indicating the presence of eddies or whirling currents in the moving mixture. The experiments seem to prove that explosions were oftener caused by such whirlings than by simple velocity of current. Circumstances which caused the air to reverse and flow in a different way in the lamp to that in which it was intended were considered as highly dangerous, this reversal was made manifest by the pressing down of the flame. M. E.

### IMPROVED MINERS' SAFETY LAMP.

SIR,—You will, I feel sure, with your usual courtesy allow me space for a description of a valuable improvement in Miners' Safety Lamps, more especially with regard to their use in mines which are known as "fiery," subject to outbursts of gas, or dangerous on account of the large extent of goaves which are unapproachable, and may contain large bodies of gas. The term "safety" as applied to the ordinary type of miners' lamps may be said to be a misnomer, and from the well-ascertained fact that if they are placed in an explosive mixture of air and gas travelling at the rate of 6 to 12 ft. per second combustion is sustained and gives off its results at a temperature which will readily pass the gauze and cause an explosion. It is also well known that if flame can be maintained in the bodies of lamps the gauze or gauze and glass become heated to such an extent that they will ignite gas surrounding them.

The suggested improvement in order to prevent this state of things, in the words of the specification, is briefly—"The use in combination with safety or mining lamps of small incombustible bodies of regular or irregular shape, but always so as to leave numerous small interstices between them, and so that any flame of gases in combustion in the body of the lamp will have to exist in or pass through such insterstices and so be deferred of its vitality, and eventually put out." It will be seen by the foregoing that one object attained is the subdivision of the space, and consequently of the flame into minute portions. In the ordinary type of lamps the gauze portion may be filled with a body of flame; but by the improvement the flame cannot exist, being so obstructed in its passage by the material with which the body is filled, and also leaving the spaces in passing occupied by carbonic acid gas, and so preventing a re-ignition downwards. The absence of sufficient body of flame to be operated upon, so as to raise the temperature sufficient to pass the gauze at flame-heat, effectually prevents the possibility of the lamps causing an ignition of the surrounding atmosphere. The "protector" system of locking and lighting so well known and largely adopted, combined with the above improvement, make the lamp in every way a "safety" lamp, to an extent hitherto unknown. This assertion may be disputed, but if any guarantee is required I am willing to submit to a penalty if anyone can cause this lamp to explode by submitting it to any conditions which could reasonably be expected to occur in a colliery. W. E. TEALE.

*Worsley, June 16.*

### MINING IN SAN FRANCISCO.

SIR,—In apprising you of the condition of mining affairs at this point it is, perhaps, hardly necessary for me to say that San Francisco is the centre of mining, bullion, and banking operations, and the base of mining supplies for the entire United States west of the Great Salt Lake. A good deal of business is also done here in connection with Utah, the Beach Hills and Leadville districts, Sonora, and the West Coast of Mexico. So far as the mines of British Columbia, Washington Territory, Oregon, California, Nevada, Idaho, Montana, Arizona, and New Mexico are concerned the business is all done here. Prospecting parties for those regions usually start from this place; the capital for developing the mines is commonly obtained here; the machinery and many of the supplies are purchased here; and the bullion comes here to be refined and coined, or shipped to the Eastern States and foreign countries. Mines are bought and sold here, either on the Stock Exchange or by private contract; the mining engineers all have their offices here; and most of the incorporated mines have offices or agencies here.

So much for the geographical scope of San Francisco as a mining centre; its importance is to be measured by the amount of bullion handled here. Since 1848 this has amounted to not less than from 300,000,000*l.* to 350,000,000*l.*, and at the present time, though far less than it used to be, it amounts to upwards of 12,000,000*l.* per annum. In substantiation of these figures I would refer the readers to my "History of the Precious Metals," chapter xx. (Geo. Bell and Sons, London, 1880), reviewed in *Mining Journal* of May 15.

Of the vast precious metals trade represented by these figures the English have not failed to secure a large share. There are several English banks here—as the London and San Francisco, Anglo-Californian, Bank of British Columbia, Bank of British North America, Hong-Kong and Shanghai Banking Corporation, and many private bankers, generally branches of London houses. These all transact business in bullion, and sometimes have other relations to the mining interest. They are all in high standing, and appear to do a profitable trade.

As an evidence of the extent of the bullion trade transacted by some private houses here, I refer to the evidence given before me, as Commissioner of Mines, by Mr. Albert Gansl, agent of the banking house of N. M. Rothschild and Sons, London. This evidence will be found printed in the Appendix, page 49, of the Report of the United States Monetary Commission of 1876, a copy of which has been deposited in the British Museum Library, at London, for reference. Mr. Gansl stated that no less than $60,000,000 in bullion, of which 65 per cent. was silver and 35 per cent. gold, passed through his hands in the course of a few years, all of it coming from the Comstock lode, and much of it from the Belcher Mine. On page 53 he states that this occurred during four years, which shows a business in this bullion alone, by a single house, amounting to $15,000,000, or 3,000,000*l.* per annum. He also states that he did not buy it direct from the mines, but from the Bank of California, proving that at least two houses handled it and made profits on it. The probability is that half-a-dozen, or more, houses handled it between the mines and the mint, wherever it was coined. Another witness affirmed before me that upon a single transaction of $397,413 paid for by a draft on London for 80,724*l.*, an English banking house here had made a profit of 24,478*l.*, or about 30 per cent. See the details on page 29 of Appendix to last-named work.

Besides banks and banking houses, other English concerns are here which transact a large and profitable business in insuring against fire, stamp mills, smelting furnaces, and other mining property on this Coast, and this alone comes to a very important item.

Having thus briefly shown the importance of San Francisco as a mining centre, and indicated to some extent the share of the mining business transacted here, which is enjoyed by English houses and agencies, I propose in my next dispatch to set forth in detail the past, present, and probable future production of the precious metals in the United States. ALEX. DEL MAR, M.E.,

United States Monetary Commission, &c.

*Sansome-street, San Francisco, May 27.*

### NEW MEXICO, AND THE VALLEY OF THE UPPER RIO GRANDE, OPENED BY RAILROAD.

#### COST OF COPPER PRODUCTION IN NEW MEXICO. NEW GOLD DISCOVERIES OF OLD DATE.

[Special Correspondence by F. M. F. CAZIN, Mining and Civil Engineer.]

Four years ago, when your Correspondent first reported from New Mexico, it was an out-of-the-way country, known to the world's trade only as a producer of low-grade wool, and to the world's speculators only as the territory where some unfortunate Dutchmen had squandered their money in the Maxwell Land Grant enterprise. What little gold, silver, and copper then was exported (less than half a million dollars worth a year) was credited to Colorado, because these products reached connection with the civilised world at a rail road terminus situate in Colorado. (Grenada, La Junta, El Moro.) Trade was carried on nearly exclusively by Jewish houses, because the native Catholic population of mixed Spanish and predominately Indian blood and the Israelites there existed, and does still exist, a sympathetic link, giving some probability to the tales of the Book of Mormon, attributing to the Indians descendency from some of the Israelitic clans.

To the United States the territory of New Mexico was the country to send bad officials to, in order to get rid of them without much noise being made about it, where they could steal and get rich without the public Press taking any notice of it. New Mexico was a conquered province (1847) where these officials had only to combine interests with a few aristocratic families in order to have a sweeping control over all the rest of the population, in part poor, indolent Mexican peons (slaves), and in part Pueblo-Indians. The maintenance of military posts all over the territory by the Federal Government at an enormous expenditure to the Union formed the main, and nearly unique, source for money and acquisition in general, the natives living on tortilla (dry pancake) and atole (cornmusks).

For property and life there existed but little security, because the civil and criminal Courts were run by a set of corrupt lawyers, who never suffered a criminal who could pay a high retainer to be punished, but who always had an example of justice set up in punishing the poor, unless he was a hanger-round and dependent to one of the associated aristocratic houses. Perjury had a very low price in general, because much offered; and to assassinate, even in the hotel lobbies or streets of the capital (Santa Fe) of New Mexico was an offence easily atoned for by a few thousand dollars. Civil litigation was decided by tricks and favours, and not by statute, Mexican jurors never deciding against their own kindred, or in favour of what then they called, and what they now call, "un Americano," a designation of the same bearing as the Roman designation of "barbarus." The American element, strange to say, was the only opposition working against the official, federal, corrupt element, and no exception thereof was known, unless it existed in some criminals, on whom their known crimes gave a hold to the officials, or in some indolent renegades intermarried with Mexican or Indian women. A more desolate and detestable country, as far as social relations were concerned, than New Mexico at that time was cannot be imagined. With all this the country possesses a climate which has no superior on this globe for its sanitary invigorating power, and its agreeable qualities. It possesses natural resources which are surpassed nowhere on this continent.

A great change has come. A railroad has penetrated into this territory down to the Rio Grande del Norte; a bridge has been laid over this river, and construction is carried on from both ends at about a mile per day, in order to make connection between our valley and the seaport of Guaymas, on the Gulf of California. The railroad has brought American immigration. A public Press, independent of the old corrupt and criminal official circles, has sprung up. The departments in Washington, for their own sake, can no longer abandon New Mexico to a set of plunderers. The peculiarly American class of "prospectors," those storm-birds of the approaching enormous cloud of migration, have set in, and stick steadfast to their statutory rights as citizens and miners.

The old power is going to pieces, and some fresh uninculpated official elements are mixing up with the old corrupt set, and are impeding their accustomed nonchalance as suppressing and robbing. Out of the native population also a new element is springing up, composed of those of the former slaves, free since 1865 only, who by industry (an exception in the race) have acquired a home and means for being independent. This element is the only one of the native class which can or will assimilate with the American people, and the only one which will hold its own now that the tempest of migration has set in in its full power, initiating the autumn season of usefulness and harvest in this until now useless territory. Not all is yet as it should be. The railroad authorities, ill advised as they are, believing in the treacherous, unreliable, and in their hearts inimical aristocracy, and using the old law corrupters as their legal advisers, and thus reviving the old pernicious powers, instead of leaning on the sole element of industry, enterprise, and sincerity in the American element. But facts are stronger than error, and the stronger element is bound to conquer—namely, the element of law, order, and enterprise.

This short review of the past may also be the farewell to it, and future reports shall be devoted to what present time developes.

The prevalent attraction at present is the new White Oak district. Such is a new (American) name for what your correspondent years ago reported about as the Jicarilla Gold Mines, and no more need be said but that these mines helping the town of Las Vegas are considerably advertised by this town. There are good gold veins and good placer mines out there. A few will get rich there, and a good many will remain as poor as they are. There is plenty of gold in New Mexico, but the conditions for its exploration are not so favourable as they were and are in California. If in California each dollar's worth of gold got has cost one and a half dollar, the dollar's worth of gold got in New Mexico will cost two, on account of the scarcity of water and water power. In silver-lead ores the Cerrillos, Sandia, and Magdalena mountains are rich, but as yet no practical test has been made. Of the three the Sandia has the best promise, because the lead ores there assay as well in gold as in silver, and because a close vicinity to anthracite coal and to the waters of the Rio Grande offers economical facilities unequalled in any one of the other districts.

But copper will be the metal procuring to New Mexico its position amongst the metal producing territories, assisted by the production of gold, silver, and lead as accessories. In former years I drew the attention of your readers to this fact, when reporting on a stratum carrying copper ores occurring in Abopass; also when speaking of the San Pedro and Canondel Aqua Consolidated land grants; and lately when reporting on some discoveries made in the Nacimiento

mountain range. Close observation at many places all over New Mexico has enabled me to convey an idea of what the main object of copper mining will be in this territory, but not the sole object, as there are manifold occurrences of copper ore different in character from the most prominent one, the one I intend to treat of to-day.

A very large area is covered in New Mexico by the cretacious coal formation. In many parts the members of this formation lie still unbroken and horizontal, such as they were deposited. In other parts they are broken, disturbed, and uplifted, and thus exposed on the sides of bluffs, either by cutting canons in horizontal position or by being uplifted from their original position.

At the very basis of this series, by some considered as cretacious, by others as triassic, there is found a massive stratum of sand rock, from 60 feet to 100 feet in thickness, by Hayden often referred to as greenish and massive, the sandstone which the miners of the Harts would call Quader Sandstein, and which the Cornishmen call greensand, by its looks. In many places this massive rock is found to overlie azoic or eruptive rock directly. The rock is comparatively hard, and where lifted up it is fully exposed, because the formerly overlying softer strata were not equally able to resist atmospherical influences, and have been washed and blown away.

On my excursions I have met with this peculiar sandrock often, but not until once my attention was directed to the circumstance have I examined it closely enough to know whether it carried ores of copper everywhere. But since I first knew it to carry these ores I have seen it nowhere but where the ore was in it. In some localities the ore consisted, like at Mechernich and Commern, in the Rhenish Prussian province, of galena in merely coloured spots in the sandstone, in others in nodules of sulphides or oxide of copper of the size of peas, beans, and nuts. Everywhere the formation appeared uniform on a great area; but the one on the west side of the Cordillera de Nacimiento is deserving the palm amongst all these occurrences. The massive sandrock there is exposed and uplifted to 40°. It may there be quarried for centuries to come at the rate of thousands of tons per day, at an expense of from 10 to 20 cents per ton. The copper ore there is not in small particles, but it consists in petrifactions with palm leaves, stems, and trunks, which, when the rock is shattered (crushed), easily separate and fall apart from the rock. Pieces of clean melaconite (oxide of copper) from ¼ oz. up to 200 lbs. weight are thus obtained. More than two-thirds of the quarried rock may be thrown over the dump at the quarries as poor, and a product of ore may be hauled away, in part entirely clean and of 40 to 50 per cent. of metallic copper, and in part containing from 7 to 25 per cent. of metallic copper, the latter to be mechanically dressed to clean smelting ore of at least 25 per cent. of metallic copper.

The concentrating qualities of the rock are of the very best kind, the ore fragments having a density of 4·2, and the sandrock of 2·6 only. What impregnation of silicate of copper there is in the sandrock may be neglected, though with a good arrangement of the concentrating jigs it may be saved as well. The clean ore smelts "like lead," to use an expression which characterises its smelting quality in an absolutely correct manner. I have visited these deposits again lately so as to give them a still more careful study, and in the following I give an estimate of costs for the production of copper from the Nacimiento sandrock, so as to give your readers an idea of what eventually will be competing in the copper market of this continent.

Before entering on specification of figures I must allude to some general economical features of the case under hand. While on Lake Superior a long winter time and hard frost limit the season for mill work and shipping, New Mexico knows no such restriction. As far as the climate is concerned work may go on outside all the year round. With the employ of hand-drilling machines common labourers may do all the quarrying work under a skilled foreman. Common labour is abundant at 10 cents per hour (4s per day of 10 hours). For motive power there is good anthracite coal four to six miles distant from the copper ore, in good quality and in workable size, position, and quantity. Though there is an abundancy of pine trees for charcoal (to be obtained easily at 50 cents per hundredweight), the anthracite coal is clean and solid enough (not decrepitating under proper precaution) for smelting therewith. A stream of water flows down from the Cordillera large enough for all purposes connected with the operation of dressing the poorer ores, &c.

The ore proper is included and scattered all over the 60 ft. thickness of the stratum of sandrock, though more abundant in some of its streaks than in others. The lower yellowish part of the massive bluff, as well as a part of the upper white and more crystalline, carries regular seams of copper ore, besides the fragments filling it in a more sporadic form. The upper whitish part of the rock carries also solid masses of ore either in the shape of irregular gash veins, or, as apparently, the transformation of trees in a position as if buried when standing up.

To accurately determine a percentage of ore in this mass of rock is impossible, unless by the result of prolonged exploration, but short tests, and ocular inspection, combined with practical experience in such matters, leave no doubt but that there is enough for profitable work. If the ore had to be mined by shafts, drifts, and stopes a doubt could remain; but when we know that under similar natural circumstances—with higher price of labour than is current in New Mexico—rock is quarried at a cost of not more than 8 cents per ton, that including the hand selecting and loading of the ore, the cost of such quarrying does in no similar case surpass 30 cents per ton of selected ore. Then there is no doubt remaining as to the possibility of producing clean copper ore from these quarries at so low a cost as to render their working highly profitable; but let us consult figures. It is my opinion that the rock will yield 4 per cent. of clean ore, or from 1½ to 2 per cent. of metallic copper; but in order to have all possible doubt accounted for, a content of 1 per cent. of copper (in weight, not in volume, which makes not ½ per cent. in volume) is taken as basis of calculation. On a distance of over four miles the deposit shows nearly uniform distribution of ore, interrupted only in special localities by greater accumulations.

ESTIMATE.

| | |
|---|---|
| 1000 tons of rock are quarried at an expense of 10 cents per ton | $100·00 |
| Of these, 400 tons occasion an additional expense for hand selecting of 20 cents per ton | 80·00 |
| (These 400 tons consist of about 4 tons of clean ore of 40 per cent. copper, of 8 tons of 25 per cent. copper, these being ready for the furnace, and of 388 tons of 1 per cent. copper, giving 2½ tons of concentrates in dressing down to 40 per cent. copper.) | |
| Cost of mechanical concentration for 388 tons, at 80 cents per ton, including transport | 314·40 |
| Smelting and refining 14½ tons of ore at $20 per ton | 290·00 |
| Total cost | $784·40, |

or $78·44 per ton of copper at Nacimiento, to which about $32 of freight to New York must be added.

This estimate is fitted as closely to the real facts as my experience and knowledge permit. If it be correct, as I presume it is, copper can be laid down in New York from New Mexico at 4 cents per pound, at a rate of 3000 tons per annum from one mine only. There is absolutely nothing astonishing in this statement when it is properly considered that a similar, but not fully as tractable, ore is treated for lead at a rate of 4000 tons per day in the Prussian Rhenish province (Mechernich), with good economical success. That not a long time will elapse before Nacimiento copper goes into market is well determined by the policy of those who control these mines. Their offer to transfer half interest in a good title to about five miles of the ledge for working capital only secures a speedy success, and if English copper masters understand the time they may yet secure the control of a production which will in time to come regulate the price of copper, and will be flourishing when Lake Superior and Chili have to stand back. As yet the items are lacking for calculating what the economical result will be of shipping the concentrated ore of 40 to 50 per cent. copper per railroad to the port of Guaymas, on the Gulf of California, and from there per steamer to Liverpool or Swansea. The supply is virtually inexhaustible.

In making these statements I am absolutely free from the illusion that the estimated small cost of production will not act as making the statement appear as a delusion. Old copper masters will have for it hardly more than derision, and nobody, deeply as he may be interested in ascertaining the real facts, will go to the trouble of an investigation. But when the time arrives when these facts will become apparent in the state of copper prices everybody will have forgotten these reports, and will be highly astonished at the unexpected results. But somebody will sell copper at New York at from 12 to 15 cents permanently, and will make thereon at the rate of from $500,000 to $750,000 per year. The opportunity to do this is to-day virtually begging—not for a purchase price (no, not by far!) none is asked—only for the capital to start the production, a capital which the first year of full operation will return whether the beginning is made on a large or a small scale. Thus it has been, and thus it will be. Unless the millions are presented at our house-doors or in our long-trodden tracks we do not desire to have anything to do with them. In New Mexico money is worth 1½ per cent. per month. Is there, then, anything astonishing in the fact that enterprise is looking for support to great distances?

F. M. F. CAZIN,
Mining and Civil Engineer.

*Bernalillo, New Mexico, U.S.A., May 20.*

## MINING IN BRAZIL.

SIR,—The activity in mining matters in the United States, and the better feeling prevailing in England, is sympathetically felt here. Slow as these people are, they quickly note any movement which may affect their interests, and without the aid of the telegraph, railway, or even the stage-coach, a bit of news travels over the country with wonderful rapidity. All Europe, however, might be engaged in deadly warfare, or an earthquake might swallow the States of the Pacific Coast, without disturbing the mind of a Minerio; but let an English-speaking man, fresh in the country, look at a bit of quartz, or wash the river sands for gold, it is known and commented upon by all and every class of men—a capitalist has arrived, and every proprietor becomes at once important; he puts up the price of his fazenda, or quartz lode, and negociation with him is difficult. An instance: the Assiz Faria Fazenda and Mine was offered, and every effort was made to sell it for 10,000*l.* in the month of September, but when a Londoner arrived four months later to examine the Mount Gloria property near by, the Assiz proprietor advanced his price, and held firmly to 20,000*l.*

The Passagene Mines, formerly owned by the Anglo-Brazilian Company, are to be thoroughly explored; this company owned the Pitangui, and both properties were abandoned by the same management. The fine houses, costly water-courses, and concessions were sold for a trifle. Pitangui is now an assured success. The history of gold mining in all countries shows that at some point the pay shoots, chimneys, or bunches of ore pinch out. The rich bonanzas of Nevada, and the great mine of this province at Morro Velho, are no exceptions, and this fact should instruct prosperous companies to prepare for the time when fresh work of prospecting must be commenced. In California, the system of making all shares assessable, without personal liability to the holder, has kept the Comstock lode alive and developed its great wealth.

I shall have the result of an experiment in river mining to report soon. A Brazilian company have tunneled the spur of a mountain around which the Rio das Valhas flows, at a point four leagues above Morro Velho; the work has been going on nearly three years. It is said that the bed of this river was not reached by the ancients who washed the banks for gold. I have seen several experiments made with small coffer-dams, when from the bottom of the stream coarse gold was taken, often as much as 1 oz. in a panful of the bed-rock deposit. A concession was given to some Americans to work the river, but they have not commenced operations. If, as is generally supposed, the bottom of the Rio das Valhas is virgin ground, there will be a new extensive field for gravel mining opened. I shall visit the tunnel soon, the river bed can be fairly examined.

MINAS.

*Ouro Preto, May 9.*

## NOUVEAU MONDE MINING COMPANY.

SIR,—The fact elicited at the recent meeting in London of this company that of the 200,000 shares, of which the capital originally consisted, less than 100,000 appear at present to be in existence gives rise to the question whether those who have lost or destroyed their shares are without a remedy. The company was formed under the French law (en commandite) about 25 years ago, and for many years the concern was supposed to be defunct; but although the original property in California (which by-the-way was in 1856 more glowingly reported upon than that now owned by the company) has been lost and forgotten, the gerant has since purchased a property in Venezuela, which is said to be rich. Until Monday last there had been no meeting of shareholders for 23 years, and in the meantime many shares have, it is alleged, been lost or destroyed. Under these circumstances I would ask some correspondent versed in French law to reply to the following questions:—

1.—By what process, if any, can a commanditaire who has lost or destroyed his share certificate recover his rights?

2.—Is there no law in France which compels the gerant to hold periodical meetings, and would it not be necessary for those meetings, a large proportion of the commanditaires being domiciled in England to be advertised in English newspapers.

3.—Would an English committee formed to endeavour to recover the rights of the Commanditaires unable to produce their share certificates be recognised by the French Courts?

The re-issue of duplicate certificates would not prejudice any recent purchasers, as they have been, and still are without exception, dealt in on the Stock Exchange, and I believe in Paris as 200,000ths. If a Bank of England note be accidentally destroyed I believe its value can by legal process, and after a certain lapse of time, be obtained; and although I do not regard the cases as identical—as to value or otherwise—I cannot but think that something could be done. The duplicate certificates would, of course, have to be "nominative," and not "to bearer," and would have to bear an endorsement or enfacement that the owner would be personally liable to refund all dividends (if any) paid in the event of the original being produced. The matter is at least worth discussion.

H.

*June 15.*

## NEW FLAGSTAFF CONSOLIDATED SILVER MINING COMPANY.

SIR,—The statement contained in the prospectus of this company that the whole of the original property sold to the Flagstaff Company is included within the limits of the mines now offered by this company to the public is quite incorrect. The Flagstaff original location consisted of part of the South Star and Titus, and the north western (then unlocated) portion of the lode. Some years after the Flagstaff Company had been in possession the north western portion of the lode was located and entered upon by the Nabob Company; after this the Virginia location was made and a shaft from it sunk, which communicated with the Nabob Mine workings. The Virginia is located upon no lode, but is simply a trespass shaft sunk for the purpose of pirating upon the Nabob ore, and in the suit of Varnes *v.* Billings (one of the directors in Utah of the new company), the Virginia was perpetually restrained from entering upon the Nabob Mine by means of the shaft which they had sunk, as explained, and the Virginia owner (Billings) was condemned to pay the damages for the ore extracted from the north western part of the Flagstaff lode owned by the Nabob. The directors in America, as well as the counsel of the new company in America, are well aware of these facts. The Virginia ground is stated by the prospectus to be from 200 to 400 ft. wide and 1600 ft. long, but as no lode has yet been discovered in this ground no value can be attached to it in the sale of the new company.

The South Star and Titus Mine obtained an injunction against the Flagstaff Company as regards the trespass upon the south-eastern portion of the lode after the Flagstaff Company and its successors had literally "picked out the eyes" of that portion of the lode, and it is quite incorrect to call this part of the lode virgin ground, unless this term applies to the unpaid damages assessed against the Flagstaff Company.

It would have been far more satisfactory if the directors of the new company had published a recent report showing the present condition of the Flagstaff lode, instead of relying upon the reports of engineers made prior to the time when the 1,000,000*l.* sterling is have been taken out of it, and it would have been also desirable the question of title to what they have contracted for should been settled before they invited the public to subscribe for share

VERA

## INDIAN GOLD MINES.

SIR,—Your correspondent "Puzzled" has certainly hit the St Exchange pretty hard on their inability to appreciate the differe between a 2*l.* and a 1*l.* paid-up share. Unfortunately, like hi only hold shares in the 2*l.* gold mine, and as I see the prices c through the Stock Exchange tape every day the company in wh am a shareholder is generally in the middle. Thus, 1½ to 2, 1½ t 1½ to 1⅝. Who would imagine the middle quotation represents best Indian gold mining company, with large and valuable pla tions as well as mining rights, their paid-up share being 2*l.* aga 1*l.* of the other two companies, who, as I understand, have mining rights and no freehold, the subscribed capital of all being the same. I feel very much like those walking human s wiches Dickens describes with an advertisement fore and aft, a if I, the living man, were totally ignored, but the two pastebroa carry were considered everything. However, I shall, like "Puzzl appeal to you and wait results.

GOLD SEEKE

*London, June 14.*

## INDIAN GOLD MINES.

SIR,—I hardly think we have arrived at the proper solution of question put by your correspondent, "Puzzled," as to the relativ preciation of the Indian Gold Mines by the Stork Exchange, companies, with 1*l.* per share paid up, being quoted to-day nearly same as the one with 2*l.* paid up. Unfortunately I am only a sh holder in the latter; but, as I am a believer in its ultimate prospe it is not so annoying to me to see the shares at a discount as it mus to others, especially when it possesses all the advantages claime the other companies, and in addition the following:—1. A pract freehold of 1500 acres, with valuable plantations of coffee, tea, cinchona, estimated soon to produce a dividend of 5 or 6 per c on 100,000*l.*—2. Perfect liberty, therefore, of working in any an parts of the estates, as may best suit the developments of gold mi —3. Power to sell land for these purposes. My own impressio to the cause of the relative depreciation of the 2*l.* shares is th chiefly arises from the fact that the others enjoy the patronag and are admirably supported by, well known financial agencies, w has apparently not been the case with the South-East Wy Estates and Gold Mining Company, whose directors, however, l pleased to see by the official list at Somerset House, have consi ably increased their own holdings. Further, I am strongly of opi the 2*l.* share being quite the exception to the rule of the share mining companies, if the directors could see their way to sub-di them into shares of 1*l.* each they would then stand on a par with others, as they ought to do.—*London, June 14.*

E. I

## INDIAN GOLD MINES.

SIR,—Your correspondent "Anglo-Indian," in his letter which peared in your paper last week, referred to the meeting of the In Gold Mining Company in Glasgow, and to that of the Indian G rock Company in London, and informed you, for the benefit of sh holders in gold mining companies in India, that the statements m at the meetings were of the most encouraging nature, but gave details, as the Glasgow meeting was not open to the public.

The shares of these companies have been taken up in faith, beca of the names that are attached to them, and the official statem that have been from time to time issued; but what those intere now require to know is whether the facts elucidated by the sur of the companies themselves since their formation tend to con the sanguine expectations put forward. Thousands are interested the success or failure of this new field for investment, besides actual shareholders of either the Indian Glenrock or the South In Companies, and it appears to me that all information should be m public immediately it is received.

If, as in the present case, it is satisfactory, so much the bet but, on the other hand, it should, if unfavourable, in the interes the investing public, equally be made known. These are speculat though legitimate, enterprises; their value may fluctuate as we that of other gold companies fluctuate from a few shillings to m pounds per share, and to deal fairly with the public good new bad news should be freely communicated.

I am interested in all three companies—Indian Gold Mines Glasgow, South Indian, and Indian Glenrock—and have received printed reports both of the meeting of the Indian Gold Mining C pany and of the lecture given in Glasgow by the company's engin at the Accountants' Hall. Herewith I forward you some stateme extracted from the lecture in question, reminding your readers t they are made by a practical man, who has just returned fro general survey of the properties in the Wynaad.

The lecturer exhibited photographs of the different important po on which he had been working, and, speaking of his arrival, said "When walking along the road to Devalah we met with quartz re here and there crossing it. The road in places is completely c posed of quartz, and I got off my horse once and took up some of stones, in which I saw several specks of gold. There is not m stone adapted for the repair of the road, and, therefore, the nat go up on the road banks and knock down a few tons of quartz, br it on to the road, and break it, and thus make repairs. Here there for about a quarter of a mile you may walk upon nothing quartz." And he further added: "You may think India a country, but we had 11 in. of rain in one day, and during the tw months previous to my departure, on Feb. 21, there had been 139 of rain. Under these circumstances, and with proper means of taining the water, we shall never run short."

As to the mode of native working he gave the following inform tion—"You may be interested in knowing how the native mi work the quartz. In Australia and New Zealand we have our countrymen to deal with, who use picks and shovels and work modern fashion, but the Indian natives use an instrument, wh I exhibit; the blade is entirely made of steel. I differ from report of my friend Mr. Brough Smyth, for I have measured number of cubic yards a man can do in a day, and I find that Indian native, with this instrument, has done more excavation an Englishman. (Applause.) The coolies are paid 4 annas a da about 6d., and with that 6d. they keep themselves, and are q well off, and live apparently very comfortably. I have now p graphs to show you of views taken in New Zealand. The first re sents the gold mines at Grahamstown on the Hauraki Gulf. T place was only a very small town when I first went to it, but in years we had a population of 14,000, and had mines of very g capacity. This province in New Zealand does not differ very m from the Wynaad district. The next photograph represents main shaft of the Caledonian mine that I was attached to for s time. It was one of the most successful; we got an immense qu tity of gold—about 13 tons—and it all came up through the sh you see. The difficulties that we have to encounter in mining often very considerable, owing to water coming into the shaft. Y may go down 50 ft. and find water, and the deeper you go the m water comes in. It is most satisfactory that in all your districts the Wynaad there is no difficulty whatever of that kind to encount We hope to have no shafts, and do not want steam engines."

Mr. Guild speaking said:—"It will be satisfactory to the sh holders present that I should ask a question, which I can assure is not by any preconcerted arrangement with Mr. Severn—whet or not the indications he has seen, or the explorations he has c ducted, in India are of such a character as to give us hope that shall go on to a successful issue, and whether they are of a simi character to those obtained at the first operations in Australia New Zealand? I wish Mr. Severn to say without any exaggerati whether there is a fair hope that we have got a property of valu Mr. Severn:—"Since 1853 I have been constantly working on go I have no hesitation in saying that I think the prospects here magnificent. I say so because you have asked me, and that is opinion. I have every hope of success; indeed, it is beyond a h with me." Such evidence of prospective value from so high an

thority must be very satisfactory to all who like myself are deeply interested in the development of this great industry in our Indian empire.—*Glasgow, June* 14. SOUTH INDIAN.

## BORDEAUX TRAMWAYS.

SIR,—On May 22 there appeared in the *Mining Journal* a letter in reference to Bordeaux Tramways, and signed "A Shareholder." That gentleman, after giving to the public the benefit of his information obtained in the course of a visit to that city, ends his letter by congratulating his fellow-shareholders on their prospects. As I know Bordeaux from a long business connection with some of the most eminent firms there, I should like to know on what grounds those prospects are founded. In the first place, it cannot well be from a comparison with what the Omnibus Company did. That company made money, but they did so because their capital was only one million and a-half of francs, whereas the capital of the Tramways Company is 8,000,000 francs! The cost for laying down the line in the City of Bordeaux is 30,000 fr. (or 1200*l.*) per kilometre, and the expenses enormous, in consequence of the establishment they have to keep. Were there nothing else the shareholders' prospects would not be very brilliant, but there is a little item the existence of which confiding shareholders may not be aware of. Besides the keeping up their own line in repairs, &c., they have undertaken what, by Bordeaux capitalists, is considered a most onerous charge—that is, they have bound themselves to keep up in repairs the pavement of all the streets or extent of their system! That alone appears to be fatal as against making profits. The directors, doubtless to make things look well, have opened first the portion, the only portion, of their line I consider likely to pay—that is, along the Quai des Chartrons. In the first week their returns were 14,000 fr., now they have come down to about half of that sum, and when the whole line is opened the returns, I am informed, will be less than this in proportion.

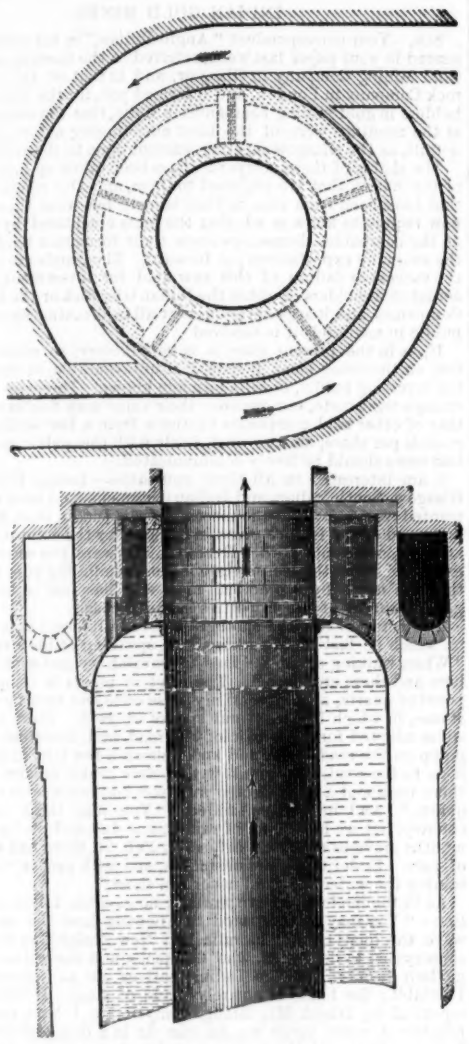
Such are some of the facts which I have thought right to place before those who might be tempted to part with their money in that quarter. Unless the company has been formed, as is the case in 90 out of 100 limited liability companies, for the purpose of creating an income for a body of officials, and far be it from me to suggest that such is the case, I am of opinion that the undertaking will not answer the purpose for which it has been formed.

*Cheltenham, June* 14. NOT A SHAREHOLDER.

## THE NATIONAL BOILER INSURANCE COMPANY (LIMITED)

SIR,—The recent disastrous explosion of a large "Rastrick" boiler at Walsall has attracted considerable attention, and various suggestions have been made in reference to the setting, &c., of this class of boiler, which is still a favourite construction with some ironworks managers; and, as many continue to be made, it is important that nothing shall be omitted which will reduce the risk of working them.

I enclose illustrations showing plan of setting, which I first suggested nearly 20 years ago, and which has been adopted in many such boilers with great success by some of the largest firms in the country.



The cast-iron ring or bed-plate shown on sketch is bedded firmly on a brickwork foundation. The boiler, instead of resting directly on the bed-plate, is supported by not less than five wrought-iron plate-legs, rivetted to bottom of boiler by double 3-in. angle irons. Angle irons are also attached to the lower part of these plates, where they rest on the bed-plate. The vertical plates should be of considerable thickness.

The outer brick wall receives the first impact of the heat from the furnaces, instead of it striking the boiler-plates, the liability to fracture thus being materially reduced. The inner ring of brickwork connects the vertical tube with the passage to main flue.

Should repairs be required at lower part of boiler they can be executed without disturbing it, by simply removing the brick walls. The walls do not support the weight of boiler. If the plates are carefully attached, so that lower ends are at right angles with the axes of the boiler, is much simplified.

The above sketch is for a boiler 7 ft. diameter. The position of furnace necks can be arranged according to convenience, but it is advisable not to place them opposite the legs.

This system very much reduces the liability to injury, and also the risk of explosion of this class of boiler. I shall be glad to send copy of this to any iron firm, if they desire it, if they will write me to the address below.

I may add that I prefer internally-fired boilers for utilising the heat from iron furnaces to any of externally-fired construction, and especially on the score of safety. I know that there are sometimes practical difficulties in the way of the general adoption of the internally-fired boilers for these purposes; but am of opinion that, with suitable modification according to circumstances, these can be overcome.

Allow me to state, as some misconception has arisen in reference to the Walsall explosion, that the exploded boiler was not insured with this, the "National," Company. HENRY HILLER,
Chief Engineer and Manager.

*The National Boiler Insurance Company (Limited),*
*St. Ann's-square, Manchester, June* 15.

P.S.—I note a letter in the Journal of the 12th inst., which contains extracts from my last annual report. The writer also states that about 5000 boilers are insured in this, the "National," company. Had he stated 8000 he would have been near the mark.—H. H.

## HALKYN DISTRICT MINES DRAINAGE SCHEME.

SIR,—Everyone interested in mining enterprise, and particularly in connection with those districts requiring deep drainage, must feel under obligation to you for the description given in last week's Journal of the above work. The fact, as stated, that as much as 100 yards have been driven per month in limestone removes the great difficulty of time from mining undertakings. It would be interesting, however, to your readers to know what is the sectional area of the level now being driven under the Halkyn Mountain, and also what is the cost per yard forward? ENQUIRER.

*June* 16.

## TIN MINING, AND THE SMELTERS.

SIR,—Could not some arrangement be made by tin miners to render themselves independent of the tin smelters? Say, six or more of the mining companies advance as much money as would put up a tin smelting work, as near the centre of the mines as could be got, so that neither of them would have an advantage over the other in cost of carriage; each company would deliver their ore free to be smelted, and have it returned to them in blocks or ingots as wanted, with their own brand upon it, at the end of three or six months. The exact cost per ton would be known and debited to the different companies, without any profit being added, but simply the cost of making. There might be some little difficulty in apportioning the cost if one or more sent a much larger proportion of ore than the others, but this could easily be arranged. Some plan of this kind I think would work well, and obviate the necessity of putting up smelting works by the different companies. I see from your Cornish Correspondent's remarks the sost of the works would not be heavy. Some of your practical correspondents might give their views on the matter.

*Glasgow, June* 14. J. B.

## MINE MANAGEMENT AND OFFICES—LONDON OR LOCAL.

SIR,—The writer of your Report from Cornwall returns to this subject and tells us it is one of very considerable importance, so that if I enter the lists a second time to combat views that I believe detrimental to the best interests of mining, it is from no personal motive. I have no acquaintance with your Correspondent.

In last week's Journal your Correspondent has written two very long paragraghs, but it is difficult to see that he has added anything to support the proposition of his first article, or to disprove my answer to it. The first article had one advantage, however much you might differ from its object—you could understand it. The assertion was, "the management of a mine to be efficient must be local," and it followed as a matter of course that if it was not local then it was not efficient. This time my opponent's line of argument is not so well defined. We are told the question is not whether in all cases the management should be local, but whether local management should be the rule, requiring strong argument to admit of an exception. Then further on he proceeds to say that even I would probably admit that however desirable London offices may be in many cases, and he is by no means disposed to be so severely logical as to argue to the contrary, that there are good reasons why the rule should be the other way (of course I admit nothing of the sort); and further, as a sort of clencher, he says the burden of proving the necessity of London offices must rest with those who advocate them.

A good deal of the above looks as if your Correspondent perceives that in his first article he has been too dogmatical, and is yielding ground. But it is amusing to hear that it lays with us to prove the necessity of London offices. Who is the plaintiff in this matter? Who introduced the subject? Who is attacking London offices? We may well be told it is not necessary to be severely logical. I do not for one moment think that your Correspondent has not the interest of Cornish mining at heart; without doubt he has He and all interested in that industry must have felt the depression that has existed so long, and wished to remedy it. But he has made a great mistake in advocaling the localising of Cornish mining and its management (as in the past times). If Cornish mining is to be supported in the future it will follow the wake of human progress, become less and less local, and more and more national, and the Metropolis must be the centre of management.

The railway and telegraph are only means for this end. Mines now are supported not by the few but by the many. Not by some half-dozen subscribers to a cost-book, but by many hundred and even thousand shareholders. It was no unusual thing for mines in old days to be divided into as few as 12, 24, or 48 parts, and it is by no means uninteresting to note how, as time went on, and shareholders increased and extended, shares would be subdivided into 96ths or 144ths, and then be still further multiplied until the divisions would number one to many thousands. While now that the local bounds have been almost if not entirely burst, it is common for a mine to be divided even into 50,000 shares, and nearly all held out of the county.

I should be unfair if I ignored two points on which your Correspondent attaches great weight as in favour of local management—the advantage to the shareholder in having a personal opportunity at general meetings of seeing his property, and the prevention of fraud; the former he appears to think a protection from the latter. I am at one with your Correspondent in wishing to protect the honest mining investor from the hands of dishonest men, but cannot see that local management is the remedy. In my former letter I showed how common it is now for the majority of shareholders in Cornish mines to be "out adventurers," the bulk living in or near the Metropolis. We cannot control the situation of the mine—that must be in the spot where Nature placed it, however out of the way; but why should the office and management? because, it is argued, if meetings were held on the mine shareholders would go to them and see their property. I doubt it. It is no unusual thing—in fact, rather a common occurrence—for London managed mines to hold one meeting in each year on the mine, and invite shareholders to attend. The opportunity is not taken advantage of as might be expected. It is rare to get the attendance of half-a-dozen shareholders, exclusive of the executive.

Suppose, however, for the sake of argument the investor does attend, what knowledge does he obtain? He must be a bold adventurer indeed if he ventures underground, and a knowing one if he understands anything he may see there. Few will dive so deeply into the matter, and the journeyed adventurer will generally be a superficial observer. The journey down may be pleasant, the company agreeable, and the country air exhilirating. He may feel in good temper and good spirits. One or more engines may possibly be looked at, working, so the shareholder will be informed so many strokes per minute; probably some horses may be observed trudging an endless journey around a wooden drum, raisiug, it may be, a quantity of stuff, ore rich in mineral he understands, but which, for any knowledge he has to the contrary, may be stones for a road in want of repairs.

He may partake of the hospitality of a "counthouse" dinner, and, if a temperate man, get back to his hotel in safety, fully satisfied that if not realising a present fortune he is doing his part to develope the mineral resources of the country in general, and Cornwall in particular. But his own inspection enabled him to estimate when he may get his first dividend, though practically he has no more knowledge than if he had attended a meeting in London and heard the state of his property explained to him by the manager or agent come up from the county for the purpose of giving him information. It is quite right for the management to visit the mine, not on account-days, but at all times, and look into everything, but for the investor to go occasionally to a local account meeting is of little practical good, even as a protection against fraud. So long as evil exists in the world there can be no perfect protection against fraud. I have great faith in Cornwall, knowing many true and honest hearts among the mining men there; still, for all this, there are some black sheep in every flock, and I would not mention what I must say, now that your Correspondent has brought the subject forward, and alluded to swindling in mining having its centre in London, and of "glowing statements in prospectuses," "promises at meetings," and "wonderful reports." London, I know, is not guiltless. It is a large place, and has its proportion of bad ones, but when worthless mines have been put forth with "wonderful reports," those reports I find have always been vouched by and had Cornish names attached to them. Some modifications in the existing laws, and, perhaps, the appointment of a public prosecutor, might do something to prevent fraudulent mines and companies; but moving the management from a public place like London to the comparative retirement of Cornwall could not effect any benefit. I now for a second time take leave of this subject, having endeavoured to combat the opposition with all courtesy and no personality, and if I have treated some part of the matter with less gravity than I should have preferred it is only because I have been reminded that it is not necessary to be "so severely logical." E. ASHMEAD.

*London, June* 17.

## MINE MANAGEMENT—LONDON OFFICES.

SIR,—Mr. Ashmead's letter in the Journal of June 5 on the question of London or local managment seriously deserves the consideration of shareholders. There are pros and cons, and much to be said on both sides, and it appears to me that the whole question resolves itself into this—Where are the majority of the shares held? If in Cornwall or in the neighbourhood of the mine then I would say let the management be on the spot, but when a large proportion of the shares in any company are held in London and in other parts of England, which is the case generally, then, in my opinion, London is the proper place for the conduct of the company's affairs, being more central, and more in the way of travellers from any part of the country. The argument that the public would have been hundreds of thousands better off had they paid periodical visits to their property I do not concur in, having made some visits to the county for that purpose. Perhaps nine-tenths of the holders of mining property know no more of mining than a marine, and what any of them would gain by a walk over the mine and an introduction to two or three steam-engines, the stunning stamps, the dressing-floors, and perhaps a few piles of tinstone or copper ore, I cannot conceive, and this would really be the full extent of the practical knowledge they would acquire. That they would be invited to examine the cost-sheet and merchants' bills, or their attention called to the price of materials, and an inspection of the bankers' book, is entirely another matter, but assuming this were suggested, it is only a thorough business man, and one conversant with mining, who would make much of his investigation. I remember once a shareholder (an accountant) disputing a balance-sheet because he could not make out why 20 cwts. of copper at 4*l.* per ton did not carry out 4*l.* He was not aware that there are 21 cwts. to the ton, but this by the way As a matter of course the visitor after his surface promenade would attend the meeting, and, doubtless, be much impressed with the large attendance, consisting chiefly of merchants, mine suppliers, and shopkeepers, little dreaming that the ulterior proceedings were more in the minds' eye of seven-eighths of the company than the business of the meeting. The purser by privilege would take the chair, read the accounts, and make a speech, to be followed by a flowing oration from the agent. The opinion of the Chairman would be solicited as to the future prospects of tin, of which he might know about as much as his visitor. The cost-book is signed, and the table cleared for the most important part of the day's work—a good dinner. Considering the appetites of the company, which a navvy might envy, there is but little done in the way of talking; however it comes to an end, the cloth is removed, and decanters are brought forth, and tumblers by the score set in motion, together with the usual concomitants for a brewing.

A tap at the head of the table and the chairman rises to propose the usual loyal toasts, which are invariably embodied in one, unless it happens that the landlord's stewart or agent is present, and then of course he is called upon to respond to the good wishes of the meeting for his master's health, and sometimes for his continued generosity, but this is not often. Then follows the toast of the day—"Success to the Mine," with a long speech full of congratulations, flattery, and promises, and although Mr. Editor you may object to the remark, I must say humbug (but then is not this element often introduced in after dinner speeches), winding up with a reference to the usual ability displayed by the worthy captain, his attention to the shareholders' interests, &c., and a proposal to drink his health. The worthy captain makes a speech which no one but a miner can understand, and then the visitor is led to believe that his presence has cast a gleam of sunshine to fall upon the meeting, that he is in possession of a valuable property, &c., and if he is a wealthy man he may consider himself lucky if he is not confidently advised to increase his interest, and so relieve Mr. Purser and Mr. Captain of a superfluity of the good things to come. On his homeward journey he would possibly reflect on all he had seen and heard, but I question much whether he would have derived so much knowledge by his visit as your Cornwall Correspondent would have us believe. So much for a meeting on the mine, and however satisfactory everything might have appeared to Mr. Visitor, let him quietly examine the accounts that he will shortly receive. It is not improbable that he will find that there are costs not brought up, thousands of pounds owing to merchants and the company's bankers, and a heavy annual charge for bank interest. Of course there are some mines that cannot be classed with such a one as I have represented. At the same time there are many where continued abuse of the laws, as laid down by the Stannaries Court for their guidance, has been so frequently commented upon in the columns of the *Mining Journal*. Now let us take the other side, and on what the same visitor would or should find at a meeting held in a London office, where the affairs of the company are controlled by a London committee.

If not so large an attendance the meeting would, as a rule, be composed of gentlemen who really take an interest in their investment, and although they may be guided by the direction of the committee they have before them every document necessary to verify the statements of amount, and to enable them to ascertain their actual financial and prospective position. The cost-sheet, merchants' bills, and vouchers are for their inspection, and in a well constituted and properly conducted concern an overdrawn banking account is seldom to be found. A report from the company's agent or agents is also for their reading, minus the usual embellishments we get at a meeting on the mine. A mining company with shareholders scattered over the British Isles should I maintain be governed by a committee and secretary, having an office in London, in preference to placing the whole management in the hands of a single individual—a purser. I do not suppose everybody knows the great powers vested in a purser. He prepares all costs, orders material, in many instances has the drawing of all cheques, receives all calls when made, all tin and copper ore bills pass through his hands, and he takes the chair at all meetings; in fact, is all omnipotent, and I think many will agree with me in saying that no body of shareholders is justified in permitting so much responsibility to rest entirely in the charge of any one person. I am not questioning the honour or integrity of anyone, and to their credit be it said that seldom or ever do we hear of an abuse of the great confidence that is placed in them. It is the principle that in my opinion is wrong, and in giving the subject of this letter—London *versus* local management—every due consideration I most conscientiously believe that shareholders' interests are better protected by having the business of a mining company conducted in London under the control of a committee of management. To refer to old times, who ever regretted their connection with the Taylors or the Thomas's, whose management I have always heard extolled to the highest pinnacle of perfection, and how many Cornish merchants would be glad to look upon the like again. Who can say that they ever allowed costs to be in arrear, or merchants' bills to remain unpaid from year to year, or a bank account to be overdrawn to the tune of thousands of pounds? And this was London management. As to swindling concerns, to which your Cornwall Correspondent alludes, he must be aware that there are black sheep in every flock, and

although it would be hard to say what is and what is not *bona fide* and legitimate I fancy I could point to some few in the West promoted and encouraged by Cornishmen that may perhaps deserve the title he gives to those unmentioned concerns having their chief centre outside Cornwall. He must not try to make his beloved county the model of virtue and perfection, for it probably contains some black sheep as well as the Metropolis, and although, as times go, it is indubitably justly entitled to its share of honesty it may be endued with sufficient selfish desires to warrant the transposition of the Cornish motto from "One and All" to "We'll have it all."

AJAX.

## THE LEAD TRADE.

SIR,—I hear that the suggestion made in last week's Journal, that the principal lead producing mines should withhold their produce from the market, is likely to be acted on by one or two influential mines. There ought to be no difficulties in the matter, as, even were money required, temporary advances could easily be obtained on such good security as clean lead ore; and with such large falling off in the produce of Spanish mines as there is, a revival would soon take place.

MINER.

## LEAD MINE ENTERPRISE IN LLANARMON.

SIR,—I observe in last week's Journal that your North Wales Correspondent has a playful allusion to "Enquirer" in a passing comment on mining operations in this district. I can only say for myself that I am obliged to him for "keeping his eye" upon this neighbourhood, and that it is possible I may have the pleasure to invite him some day to look at something else than "waste heaps," and "fields covered with lime," particularly when the North Wales Institute of Mining Engineers is established, so that at least the first of a series of field lectures may be given to enthusiasts and dullards. My object all along has been the good of the neighbourhood generally, and not a personal one, in my communications to the Journal. I do not wish to narrow it down to a personal matter in any future notes I may send, and I dare say if your Correspondent will have a little patience he will some day hear that the efforts of your humble servant, supported by other friends, will prove of benefit to this very interesting and valuable mineral part of Denbighshire. To-day I have not time to write more, and remain as before—— ENQUIRER.

*June* 16.

## LEAD MINES—A SUGGESTION.

SIR,—It was with surprise I read the absurd suggestion contained in the letter of Absalom Francis in last week's Journal. His plan, I take it, comes very close to meriting the same definition given by Patrick Donohoo to our old friend Jan Temby of the word "Sendekate," which appears in the amusing article, "The Wild Duck, or Sportman's Arms," on the same page as A. F.'s letter. The fact is, the plan suggested is one the only aim of which could be to delude, if not deceive, the public, and which some speculators might, but no honest miner would, for an instant countenance. I express myself strongly on the point, being deeply interested in legitimate mining, not in mine company making, and interested in most of the mines named; therefore, I object most decidedly that their able management should be hampered as proposed, and for what purpose? Simply to give mineral a fictitious value for a time, so as to enable a number of "mushroom mines" to spring into existence—mines that could never pay for working; that raise lead at a cost tenfold what it sells for in the market, whose whole use is to find employment for a time for many "mushroom managers;" but, at the same time, tend to glut the market with lead, to the impoverishment of their own shareholders, and the general detriment of the whole mining interest. The mines named by Absalom Francis need no fictitious value to be given to minerals for a time. They are enduring mines; and, however much I should like an increase of the dividends, yet am willing to wait a turn in the tide, and feel that such mines as Van, Tankerville, South Darren, and others named are not for their existence dependent on mineral having a fictitious value given to it. They possess a value over and above the ability of syndicates to control, and I feel convinced will not be led into such a suicidal policy as that suggested by Absalom Francis, and which strongly reminds me of the "monkey, the cat, and the roasted nuts"—only in this case I have no fear of the cat burning her paws.

EXPERIENCE.

## MOSTYN CONSOLS MINES.

SIR,—Knowing how pleased you are at times to receive specific information touching matters which are essentially applicable to the Journal, I without apology forward you the particulars of a visit I paid to Whitford and Mostyn a few days ago. In walking from the well known Old Talargoch Mines, near Rhyl, to Holywell, along the high road through the little village of Lloe, I was greatly surprised to see many signs of great and unusual activity. On making enquiry I learned it was a new venture in mining, conducted by Capt. Woolcock, of Holywell, who is very well known in the district. I at once obtained an introduction to him, with a request that I might be allowed to examine the works, which request he readily granted, and accompanied me personally over the ground. In the first place I may state that in a small field adjoining the high road I observed a splendid engine, made by Messrs. Marshall and Sons, of Gainsborough, which had been placed in its position a few days ago, and is now winding the debris that had accumulated in the bottom of the shaft during the last 30 years or more, during which time the mine had not been worked. On descending the shaft I found that it was being very considerably widened, to allow full scope for winding and putting down ladder-ways, and the levels were being cleared up. The course of the now well known Gorsedd and Merllyn lodes was clearly proved. Some fine specimens of lead ore were cut from the rock for my inspection. One of the levels running from the bottom of the shaft, under the high road, formed a junction with another shaft (named the Mostyn shaft) in the opposite field to the engine-shaft, thus causing the ventilation to be perfect. Along the roof of this level I observed three or more branches or ribs of siver-lead ore of several inches in thickness, and was informed that the strength of the ore was considerably greater in the sole of the level, and that this lode had produced in the Gorsedd Mine (close to) a rib of ore of from 18 to 24 in. wide. So rich indeed are the indications in this special part of the works that the manager has put on extra men for developing its resources. It appears that only a few days ago there were fully 14 ft. of water in this shaft and level, but without the aid of pumps all this has been made clear and ready for immediate operations.

Ascending to the surface, my conductor took me some 300 or 400 yards down to the high road, where, entering into a field about 50 yards from the high road, we came to another shaft, 20 yards in depth, which had a ladder-way down to the bottom, and which is called the Timber shaft. Descending this shaft by the ladder-way we entered a level driven to the north, dipping about one in three, and at the end of 25 yards we came upon a beautiful lode, composed of spar, yellow clay, carbonate of lime, and lead; this is undoubtedly again the Gorsedd lode, "very strong indeed." At about this point the slate-coloured shale ceases, unquestionably showing that they are in the immediate vicinity of the coal basin which is known to exist at the estuary of the River Dee. The width of the lode here has not yet been proved, but has been sunk upon some 12 or 15 ft. My guide explained to me that the air was very bad, and that it had been determined upon to sink a new shaft from the surface to facilitate the development of the lode in this section of the estate, and for which sinking tenders are now being received. Ascending to the surface my guide next took me across two fields to the south, where another shaft was reached, and sunk to a depth of (say) 22 yards. A short driving at the bottom of this shaft has discovered a grand junction of several lodes with the celebrated Holway lode. Here, again, lead ore is plainly discernable, and I was informed that the well-known Seven Stars, Milwr, and the Beilwr-Gwyn all concentrated here Contracts are being taken for sinking 10 fathoms deeper, when I have no doubt such results that have been lately found in the West Holway Mines (about half a mile from here) will be attained in this property.

Here, then, Sir, there is a mine of undoubted merit which has not yet been brought before the public, and I doubt much whether public money will be applied for, as I was given to understand that, although a public company, it was being retained in a few hands; the principal directors, in fact, taking at least 1000 shares each, thus showing that there must be something extraordinary in this undertaking. I must add that, from my private enquiries in the vicinity, it was the unanimous verdict of "one and all" that this will be "a mine indeed." The area of the property is considerably over 100 acres.

In the course of a short time it is my intention to visit these works, when I shall have great pleasure in giving you the results of my second visit.—*Chester, June* 15.

ALPHA.

## MINING IN CARDIGANSHIRE.

SIR,—Since my return to this district from Yorkshire I have put the Tan-yr-Alt Mine to work, and I am happy to say we have made a very good discovery. In driving the 12 during the last 24 hours six men have broken upwards of 2 tons of lead, and the lode is improving every foot we drive. This point is just under where the old men had such a rich deposit of ore near surface, I have also arranged for the repair of the machinery at Tynewydd Mine. Since my report in last week's Journal the men have secured the adit level. The stope alluded to in my report is looking better than ever. I expect to have the engine-shaft repaired by the end of the month ready for sinking to the 20. I also intend to commence a cross-cut to the halvan lode, which I expect to meet with in about 10 fms. drivage.

I have been asked to inspect several other mines in this district, and next week I hope to be able to give a short sketch of the principal mines, which I trust will interest some of your readers.

*Dale Cottage, Taliesin, June* 17. CHARLES WILLIAMS, M.E.

## MINING IN CARDIGANSHIRE—CROWN LANDS.

SIR,—I was pleased to read the report in last week's Journal on this subject, and thank the writer for bringing the subject before the mining public. It is a great disgrace to the parties who have the control of the so-called Crown lands that they should be managed as they now are, and it certainly does require the attention of the new Government to look into the present mode of management. Every possible obstacle appears to be thrown in the way of mining men in working the various minerals and slate deposits in the lands called Crown lands. While we are importing large quantities of lead and lead ore from Spain and other foreign countries we have abundance of lead and blende ores in Wales if only a wise and liberal policy were carried out by the managers of the Crown lands. For instance, if they were to issue an advertisement stating they would grant tack-notes for the search of minerals—say for three years, on a payment of 3*l*., and dues at 1-20th—it would cause a great development of the mineral lodes in Cardiganshire. The present mode is to grant a tack-note for one year, dating from the day of application; this generally takes two or three months before you get the tack-note, and perhaps from bad weather or other causes it is only to be perhaps four or six months' time for trials, and should any holder of a tack-note make any discovery it gives no time to find parties to take up the discovery. If anything wants reforming it is the present dog-in-the-manger-like management of the Crown lands, or so-called Woods and Forests. I do hope to see something done in this matter. At the present time thousands of men are out of work, and the minerals of Cardiganshire cry "Come and work here," but the managers of the Crown lands say "No." Let the slates be imported from America, and lead from Spain and other foreign countries, and drive Welshmen away from their native land to look for work abroad.

PLINLIMON.

## CARDIGANSHIRE MINES.

SIR,—I read with a very great deal of interest the contribution of Mr. Humphreys in last week's Journal on the subject of narrow gauge lines in this county. He must, however, begin in a limited way, and show that they can be made to pay. Some years ago a line was projected, and in fact surveyed to start from Llanfihangel Station on the Cambrian line, and turning off to follow the course of the Lery river up to Talybont, thence still following the river to Havan and Henwylet Mines by a tunnel through that mountain out into the valley of the Camdur, in which are situated a group of very promising mines, comprising Cambrian, South Cambrian, Bryn-yr-Afr, and old Camdwrmawr. This line might well be continued on the course of the Rheidol river past the Devil's Bridge, and so serve all the Cwm Rheidol mines, forming a complete loop line from Aberystwith, and would in the summer time prove highly attractive to visitors, affording as it would a ride through some of the most romantic scenery in the United Kingdom. I believe the greater part of the land would be given for nothing, at all events as far as the Devil's Bridge. The land in the Rheidol Valley is more valuable perhaps, but the narrow strip of land necessary for a 2-ft. guage ought to be gladly conceded; even then the engineering difficulties are not by any means great, the principal being a short tunnel through the Havan hill, but this would lay open a very fine stone quarry, which would be in itself a source of revenue. I know such a line would meet with considerable support from the principal landowners, including Sir Watkin Wynne and Sir Pryse Pryse, as it would open up large tracts of waste land now almost unproductive, and I really believe the line would pay a remunerative dividend, and would undoubtedly give a great stimulus to the mining industries of the district traversed, where there are at least a score of mines capable of sending ore to market at the present moment, and no doubt others would follow. I hope the subject will not be allowed to drop.

*June* 17. CEREDIGION.

## MINING IN WENSLEYDALE—LEAD AND IRON.

SIR,—If there is not great activity in the above district it is gratifying to be able to mention the discovery of a body of lead ore at the Worton Mine. Locally the Worton Mining sett is held in good repute—in fact, it has produced considerable quantities of rich quality lead ore, but for the past two or three years the company's operations have been mostly confined to exploratory drifts with the result of having struck a vein highly productive in lead ore in virgin ground. The ore has been struck for a few weeks, and as it has stood the test of a working trial its value is, therefore, doubly enhanced, which the gentlemen forming the company materially appreciate, especially as the natural features of the mine are all that could be desired, their main drift being at the base of the mountain, the ore, it is said, being struck above this drift, and in what is locally called Ashbank lime. They will have above and before them the unwrought beds locally called Keld Head lime, fossil lime, Preston grit, thin lime, underset lime, &c., all of which beds have been rich more or less in the other mines of the district. Much credit is due to the company for the persevering efforts they have made during the long depression, and every one throughout the district can appreciate and hope their lively anticipations will be realised—indeed, if results in any way bear out expectations it will be a boon to the mining community as well as the fortunate parties interested.

Adverting to your notice in a late issue of the *Mining Journal* of a discovery of ironstone in Wensleydale, it is greatly to be hoped it will lead to a permanent industry. As yet practical mining can hardly be said to be begun, operations being mostly confined to gathering up the loose balls of ironstone which have been liberated by the eroding action of the water in Gayle Beck, and which has completely cut the bed through, exposing the mineral on either side, and quoting the extract words of your notice—"All are agreed that the quality of the material must be first tested, and this will determine whether or not mining operations on an extensive scale shall be inaugurated," doubtless very fairly expresses the condition. The ironstone is nodular, the nodules varying from a few ounces to 1 cwt. or more, and is found embedded in a regularly stratified bed of shale from 12 to 20. ft. thick. The geologic position of this measure is fairly well known, being the shale bed interposed between what is called the 10 fm. lime and the 6 fm. lime, and where the beds are *in situ* and an average thickness it should be found about 170 fms. below the well known workable coal seam; further, what is believed to be this same bed of shale has been sunk through about 15 miles down the dale in the lead mines, and as the measures have but a slight rise to the south-west, and are cropping out the escarpment, or but little below the surface all along the south side of the valley and in places on the north, as at Hardrow Scar, it may be inferred Gayle Beck is not the only place where ironstone may reasonably be expected to be found, and it is greatly to be desired, sufficiently rich in quality and quantity to make it a commercial success.

C. R.

## IRON ORE IN WENSLEYDALE.

SIR,—My attention has been called to a paragraph in the Journal of May 29, in reference to Iron Ore in Wensleydale. The particulars contained in the paragraph are partly true and partly untrue; and I shall, therefore, feel obliged if you will announce in an early issue of the Journal the facts, which are as follows:—The quantity of ironstone in existence in Wensleydale Valley, in the neighbourhood of Hawes, has been ascertained to be over 20,000,000 tons. These figures are arrived at by the late Prof. David Forbes, F.R.S., and Daniel Jones, C.E. and F.G.S., and there is no doubt as to the correctness of their calculations. The quality of the stone is also admitted to be excellent, and is known by the name of clay ironstone. The only question in dispute at the present time is the cost of getting the stone, and it has been variously estimated at from 4s. to 8s. or 9s. per ton. This is the only question that requires proving. It is perfectly true that 200 tons of the stone are now being sent to Mr. Dawes' furnaces at Elsecar for the purpose of being calcined and passed through one of his furnaces with the object of ascertaining the exact cost of pig-iron made from the stone.

A. T. HAWKINS.

*Dowgate Hill, Cannon-street, June* 15.

## WHEAL CREBOR, AND THE "BEARS."

SIR,—A successful man has many enemies—a successful mine has many detractors, and Wheal Crebor is no exception to the rule. At this moment a contest is raging between the "bears" and the "bulls," and I have little doubt the former will get the worst of it. We all know that Crebor is making profits, paying dividends, and opening up a large extent of profitable ore ground; but because a small underground shaft, called a "winze," has fallen off to a trifling extent it is made the excuse—and a contemptible, paltry excuse it is—to make forced sales of shares, in order to depress prices, and then the "bears" quietly step in and pick up the shares at the reduced quotations. The "bulls," however, are going to make a resolute stand against this, and, confident in the permanency of the mine, in the management, and in the conviction of much larger dividends, have quietly picked up the shares as fast as they have been thrown on the market. Upwards of 2000 shares have been sold which do not exist, and these shares will be claimed, and those dealers and brokers who have sold shares on their own account, or on account of unnamed clients, will be compelled to settle up their differences, through the gentle pressure of the Committee of the Stock Exchange, or, failing this, be declared defaulters. I have said 2000 shares, but I believe the number to be much larger.

The present is a first-rate time to buy Crebors, but no person should think of doing so unless he pays for what he purchases, and takes the shares off the market and locks them up. A rise is inevitable. The ore making its appearance in the new shaft is a feature of very great importance, and alone justifies a considerable rise in shares. The manager, Capt. Andrews, knows very well the mine is looking better than ever, and that the reduction of value of a few pounds per fathom in one part of the mine is only one of those incidents which continually occur in large mines where many places are being worked. If every person who has bought shares will insist upon their delivery at the end of this month a great rise will be established in the price of Wheal Crebor shares.—*London, June* 17. AN INVESTOR.

## CORNISH MINING AS A PROFITABLE SOURCE OF INVESTMENT.

SIR,—The buoyancy of the metal market, backed up by a tangible advance in the price of iron, tin, and copper, are strong symptoms of a revival in the great enterprise of the county. It need only to be mentioned that ten mines have advanced in market value within the last week somewhere about 150,000*l*. Other mines selling at a low price must also follow, and those who invest in this class of mines are certain within the next few weeks to double the amount invested. Mines which are stocked with machinery, paying current costs at present price of metals (a list of which is now before me), will on a further rise of a few pounds per ton enter the Dividend List; it is in such mines the investor cannot err. From the fact that home mining pays better than any other class of investment a large amount of capital may be expected to flow into this channel; if, therefore, the investor makes a judicious selection his success may be said to be safe. I have for years advocated the prosecution of shallow mines in unexplored ground; the fortunes made by the merchant princes of the county have been from this source. I am pleased to say a step is being made in this direction in the Gwennap district by the development of the great Champion lodes in unwrought ground; the same lodes east and west, and adjoining the mine in question, have made profits of a fabulous amount. It is the opinion of the great mining authorities of the county that the development of this new ground can scarcely fail being attended with like results. The capital required in the working of new ground is nothing when compared to the clearing out of old worn-out, deep, watery mines. Devon Great Consols was a piece of virgin ground, selected by probably the greatest mining authority of the day—Mr. Josiah H. Hitchins—the paid-up capital to commence with being only 1024*l*. Before one-half was spent they came down on the great deposit of copper ore, which up to this time has given profits exceeding one million sterling. I contend that the road to successful mining is by the exploration of new or unwrought ground, as containing larger and richer deposits, less expensive to obtain, and consequently greater profits to those who embark in it.

CHAS. BAWDEN.

*St. Day, Scorrier, Cornwall, June* 17.

## THE INDIAN QUEENS MINING DISTRICT.

SIR,—As a tin mining district this seems to have been very much neglected of late years, although there are abundant traces that mining on a most extensive scale was carried on here about 100 years ago, and the remains now seen would point out that a very considerable amount of mineral wealth was derived from workings, the deepest point not more than 30 fms. from surface. One of the most celebrated mines was the old Fatwork, from which solid and almost pure lumps of tin ore of usually 1 cwt. each were raised in very considerable quantities, and this property has been worked many times—the most recent of which had taken place about 30 years ago—when the sinking of the engine-shaft to the 60 was completed, and gave promise of great success, but the death of the sole proprietor cut short its working days. Directly below this mine is one to which my attention was drawn as having been worked and re-worked very many times with great success by different parties; but, withal, lack of means at a critical time seems to have prevented its being an unqualified success, for most of the parties working it have been miners, whose pockets would not stand the continued drain necessary to obtain the materials and etceteras for prosecuting the task. This mine referred to, that called "Toll Dish," is about the best developed tin mine in this locality, and I understand vigorous efforts are being made to form a limited company to work it, and there is every promise of success. The lodes have been proved and laid open very extensively, and proved to contain tin ore in large well defined crystals, desseminated throughout. The manager (Capt. W. H. Bullock) informed me he can drive any of the levels for 30s. per fathom, and stope for 20s. per fathom, the ground being so easy.

I should imagine a comparatively small capital would be required to put this mine into a position to pay dividends. Costs will be met from the beginning if tin does not go below 40*l*. per ton. Captain Bullock, drew my attention to the manner in which the lodes passed through this sett, those of the Park Mines and Castle-an-Dinas going east and west, and those of Fatwork and Treliver north and south, thus affording ample space for discoveries and vigorous working to be gone in for. I should say the immense piles of splendid quality tinstone at surface would, when stamped, produce nearly 8 tons of tin, and almost sufficient would be realised to purchase machinery My own opinion is this mine is worthy of a trial, and will develope

into one of magnitude in course of time, and should be a good investment. With your kind permission, I will treat of the St. Austell district in a future letter. SEMPER FIDELIS.

*Exeter, June* 11.

[For remainder of Original Correspondence see this day's Journal.]

## THE SHORT HEATH COLLIERY EXPLOSION.

The report of the special inquiry at Birmingham, before Mr. JAMES MOTTERAM, Q.C., into the conduct of MICHAEL HARLE, the certificated manager of the Short Heath Colliery, contains many points of considerable interest; and, fortunately, so admirable an historical summary of the matter has been given by the Commissioner that the whole question can be quickly grasped. It appears that MICHAEL HARLE was and is the certificated manager of the whole of the Pelsall Coal and Iron Company's mining properties, about 450 acres in extent, and on which there are five pits, including the Short Heath Colliery, not exceeding 50 acres, whereon one of these pits, No. 4, is situated. On Nov. 12 the company were driving headways at this No. 4 pit on the east and west side of the shaft in the fire-clay coal measures for the purpose of proving the mine, six men being engaged in the work. On the afternoon of that day an explosion of gas took place, whereby the whole of the six men lost their lives. The No. 4 pit had been sunk to the depth of 93 yards, and was left standing for some time, when after an arrangement with the lessor to bear the expense of the fresh working the company deepened the shaft to 140 yards. At this latter depth the bottom coal measure was worked, and for the purpose of proving the bottom coal so worked headways were driven east and west of the shaft in this measure for a distance (taken altogether in both headways) of nearly 50 yards each way, but the coal proving incapable of being worked so as to return a profit it was abandoned altogether. The deepening of the pit was commenced in June, 1879, and the bottom coal measure reached and the headways respectively driven out finished by the October following.

The system of ventilation used in the deepening of the shaft was the same as existed on the day of the date of the explosion. The ventilation was carried from the surface by air pipes from 4 to 5 ft. long, and 9½ in. in diameter, joined together and fastened by holdfasts driven into the brickwork of the shaft to within a few feet (5 or 6 ft.) of the scaffold. The air delivered into the pipes for the purpose of ventilation was that caught by means of the hopper on the surface, which may be called the natural ventilation, and if that proved insufficient a blow george or hand fan was to be used for the purpose of creating an artificial ventilation. The abandonment of the bottom coal measure having been decided upon, it was thereupon determined to prove the fire-clay coal (which is a measure 47 yards above the bottom coal and 93 yards below the surface), and accordingly orders were given to brick up the insets in the bottom coal to take the air pipes out of the headings, and all the other pipes which had been used for the purposes of ventilating the shaft to the bottom coal, and the headings driven into that measure, up to the fire-clay coal measures. Orders had also been given to remove the scaffold which had been used in proving the bottom coal, so that the same might be used in the proving of the fire-clay coal measure. These orders, which were carried out and completed on Nov. 6, when after a delay of a day or two occupied in drawing the water which had accumulated in the pit and completing the bricking up of the insets, the scaffold, a light one, was placed in the shaft just below the fire-clay coal in a place convenient for the workmen to drive headways into that measure in order to prove it as they had already proved the bottom coal.

The scaffold was 6 ft. 8 in. in diameter, and there was an annular aperture all round between the scaffold and the side of the shaft. The water stood in the shaft to within 10 ft. of the scaffold. The Coroner's jury found "that the explosion was accidental, but the manager was to blame for not personally superintending the ventilation." Informations were laid against HARLE for breach of the 3rd general rule, sec. 51, Coal Mines Regulation Act, 1872, but it was proved that GRANT, "a competent person," had been appointed at this mine, and a book given to him wherein to enter his report, so that the responsibility to comply with the 3rd general rule was removed from HARLE to GRANT, who was one of the six men killed. GRANT, in reply to HARLE'S enquiry why there were no entries for Nov. 6, 7, and 8, said that he did not consider it a mine, and the Commissioner is of opinion that as to those days the interpretation clause of the Act goes some way to show that GRANT was right. As to the convictions—almost by consent—against HARLE, the Commissioner is of opinion no conviction, if the cases had been heard, could or ought to have been obtained against HARLE, and it is open to doubt whether a conviction could have been obtained against GRANT, the competent person, for the reasons he has given. The conviction under which HARLE was fined 20*l.* and costs is, however, altogether different from the other convictions, and is, doubtless, of a very serious character. This information was laid for a breach of the 1st general rule, "in neglecting to provide an adequate amount of ventilation." The precise offence is aptly and at length described in the statement of the case, and the Commissioner has had in effect to try this part of the case again, inasmuch as in the enquiry directed he feels that not only is this very question of absolutely inadequate ventilation involved, but if inadequate to any extent whether it was incumbent that some other mode of ventilation than the one resorted to in this shaft should have been adopted, and if so whether the non-adoption of such other mode of ventilation, or the improperly carrying out the made use of, establishes that HARLE, "by reason of incompetency or gross negligence," is unfit to discharge his duties as a certificated manager.

The Commissioner attaches no importance to the disputed point whether the air-pipes reached to within 4 ft. or 9 ft. 6 in. of the scaffold, as in either case they would have given little or no ventilation under the scaffold, and it was there the probable or possible existence of gas might and ought to have been suspected and provided against, which might readily have been effected by carrying the air-pipes below the scaffold and delivering air into the sump, between the water and the bottom part of the scaffold, so as to dilute and render innocuous the gas before it ascended to the surface. Unfortunately this precaution was not adopted. Reliance appears to have been placed by Harle on the annular aperture, between the scaffold and the brickwork of the shaft. To report upon the system of ventilation generally used at the pit does not, the Commissioner thinks, come within the scope of his directions, and to form a reliable opinion on that point he would require to hear much more evidence than he has heard on the present occasion. Mr. Wynne condemns the system altogether, and says it is antiquated, but does not to the Commissioner's mind offer an alternative plan likely to be adopted, and one which would be better adapted to the requirements of the miners when engaged in temporary work, such as sinking and driving out in search of mine. A system of ventilation by means of a second shaft (similar to that which is absolutely necessary before working the coal when won) is no doubt to be preferred, but such a system could scarcely be expected to be enforced in temporary works of this character, and moreover is never in such cases resorted to. The evidence he thinks fairly establishes that the system adopted was the one in general use in the mining district of South Staffordshire, and generally throughout the kingdom, and that it would have succeeded in this instance if the ventilating pipes had been carried below the scaffold is, he thinks, a question of little doubt.

There are some important circumstances which, as the Commissioner remarks, ought not to be lost sight of in the consideration of the case. No gas had ever been found in any part of the Short Heath Colliery, and the men themselves believed in the absence of gas. The pit was duly examined by GRANT on the morning of the explosion, and both he and FROST, the butty, who was working the pit by charter, were in the pit at the time of the accident and killed. HARLE bore an excellent character; he had been for upwards of 30 years engaged in the working of mines, having commenced at 15 years old under his father, he had not failed to make a daily inspection (which moreover is not required by the Act) except on the day of the accident when he was detained by other duties, and for his negligence to provide sufficient ventilation to prevent the explosion the magistrates had fined him 20*l.* and costs. In the result the Commissioner found that the system of ventilation was sufficient, but that it was not fully and properly carried out at this pit, inasmuch as it did not provide a sufficient means of ventilation under the scaffold, where, even though no gas had before been found in this shaft, or indeed elsewhere in the colliery, a careful manager ought to have suspected that it might be found, especially when it was known that there was water in the Thick coal headways, where, if there was any gas, as was not unlikely in the abandoned workings, the water would inevitably tend to force it into the shaft, notwithstanding the bricking up of the insets, and this gas rising through the water would become compressed and would lodge itself (if anything, with increased density) under the scaffold; that the manager ought not to have trusted, as he did, entirely to the sufficiency of the annular aperture round the scaffold for the purpose of ventilating the sump, and that the air-pipes should have been carried beneath the scaffold; that sufficient care was not taken to keep clear the space between the scaffold and the side of the shaft; and that the explosion, in his opinion, was caused by the gas lodged in the manner already explained underneath the scaffold, escaping upwards by a hole left in the partially sealed up annular aperture, or by a hole made there by the men in clearing off the dirt and debris from the scaffold.

With regard to the judgment to be pronounced upon HARLE the learned Commissioner observed that when it is considered that it is the duty undoubtedly of a certificated manager even in what may be termed, humanly speaking, "a safe pit" to provide against any possible, though unforseen, outburst of gas, and in the event of such outburst to provide either by himself or his agents proper means of ventilation so as to dilute the gas, he is constrained to find that MICHAEL HARLE, the certificated manager in this case, has not taken all the care, or made use of all the knowledge, he must have been possessed of with regard to these matters, but the evidence in his judgment not being sufficient to establish incompetence or gross negligence on the part of HARLE, so as to render him incompetent to discharge his duties, he has not thought it right to cancel or suspend his certificate, which at the commencement of the enquiry had been delivered up to the Court, consequently he restored it to him, but for the reasons already stated at length he felt bound to order MICHAEL HARLE to pay all the costs, charges, and expenses of and incident to the inquiry, the same to be taxed by the proper officer if the parties cannot agree upon the amount, and to be paid within seven days after the amount shall have been ascertained.

## REPORT FROM CORNWALL.

*June* 17.—Has the tide turned? It looks like it; but in face of the desperate efforts that have been made and are being devised to unsettle the tin market it is difficult to say. There is certainly far more reason why prices should go up than why they should keep down, far less go down; and we are quite sure of this, that it will be far more unwise than ever now to throw any good stock upon the market. The improvement which set in last week, followed up by the rise in the standards on Monday, and the steady gain since, has given quite an animated turn to mining matters in the county, but it really is but a very small instalment of the advance that is due to us, and which, we are more confident than ever in believing, cannot be much longer delayed. The management at West Seton have adopted a very wise course in declining to give away their produce for the benefit of jobbers. Of course, "stocking" may be overdone, but to watch for the turn of the market is an essential element in all manufacturing industry—which tin mining from the amount of manipulation really is—and why cannot mine managers and mine committees do it as well as managers and boards of directors in other concerns? Why should they abrogate that part of their legitimate functions to the smelters or brokers, or anybody else? It is a great misfortune that so many of our mines are, as it were, from the want of floating capital driven to live from hand to mouth. Borrowing from bankers is all very well as an occasional resort, and when there is enough marketable security in stock, but it has very serious disadvantages as a permanent practice.

There certainly will be some amusement, if nothing else, to be got out of the tin ticketings. In what respect the results of the published figures of the ticketing last week at Carn Brea and Tincroft differed materially from the admitted standards it is hard to see, and of course it is equally difficult to make out where the advantage lay. The only variation in the prices offered for the Carn Brea parcel was half-a-crown, and the higher price works out to precisely the "superior common." In the Tincroft parcel, for some reason or other which it is not easy to understand, there was more variation—as much as 25s.—and the average here appears to be below the standard for "common." Practically, therefore, there was no competition for the Carn Brea tin, but for the Tincroft there was, which is curious, but what is not less curious is that the Penpoll Company, which was highest for Tincroft—12s. 6d. above the next tender, that of Messrs. Daubuz—was amongst the lowest for Carn Brea. There always have been fluctuations, however, under the ordinary system, and some mines have always had a better figure for their produce than the official prices, so that this variation in itself can hardly be considered a novelty, or the whole and sole result of the adoption of ticketing. According to Mr. Pryor, however, ticketing has worked well for West Seton, which had its tin put up to the "superior" standard instead of the "common." That of course is a decided gain, but it does not appear that the element of competition was active. The smelters thought the West Seton parcel a desirable lot to have, and offered the highest standard price. What the promoters of ticketing really are aiming at, however, we presume is an abolition of the standards as rules for the market, and the substitution of current prices calculated on an individual and not a collective basis. If that is not their object indeed they can have nothing to gain.

The prize-list of the Royal Cornwall Polytechnic Society has been issued, and contains, as usual, many valuable and sundry novel features. Those which interest us most are naturally in the mechanical department; and we are glad to see that the Editor of the *Mining Journal* again offers a series of premiums for the best methods, mechanical or chemical, of making marketable with commercial advantage ores or minerals raised from mines in Cornwall or Devon, and hitherto regarded as worthless. Few premiums have had such an effect in past years in stimulating research and discovery within the scope of their operation, and there is undoubtedly much more in this direction that may yet be done. The premiums offered by the society include one for improvements in pump valves in use in mines, one for improved machines for, or modes of, dressing ores, one for collections of ore and country in which the relations of one to the other are carefully marked, and one for accurately drawn cross-sections of Cornish mining districts. Colonel Tremayne and the society jointly offer a premium for the most exact account of the phenomena of mineral veins in any mine or district. In chemistry, &c., prizes are offered for monographs or any groups or families of salts, and for collections of artificial crystals. A premium is also offered for any new and successful experiment in the application of the electric light. Among the special premiums, &c., offered to workmen and apprentices we find the following:—For a complete set of models or drawings of the various pump valves in use in mines, for a complete set of models or drawings of the steam valve now or formerly used in the Cornish mining engines, for a set o models or drawings of the various pumps now in use in mines and collieries, and for analyses of minerals. The prizes offered in the other departments do not come within our special purview.

Our new Inspector of Mines, Mr. Frecheville, is now definitely appointed, and will enter on his duties early in July. Mr, Frecheville, who is, we believe, a stranger to the county, has had considerable experience in mining matters. He studied at Jermyn-street 12 years since, and is an Associate of the Royal School of Mines. For three years he was a mining engineer in Japan, subsequently manager of a gold mine at Caratal, Venezuelan Guayana, and since then has been engaged in the United States and Spain.

P.S.—Friday: The repeated rises in tin have had a wonderful effect on the share market, which is now very excited. Probably the turn has come, though there is still need for caution. Recent appearances would indicate that before long the topmost figure of the year will be again reached. No stronger proof could be afforded of the fictitious character of the depression than the circumstances of the present advance.

## REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

*June* 17.—Pig-iron is in better sale this week, as some consumers think it wise to buy in anticipation of prices which may rule at the Quarterly Meetings on July 7 and 8. Staffordshire all-mine sorts are 3*l.* 10s. to 3*l.* per ton; hematies, from second-hands, at 3*l.* 5s. to 3*l.* 7s. 6d.; Northampton pigs, 2*l.* to 1*l.* 17s. 6d.; and South Yorkshire sorts, 2*l.* 10s. Finished iron orders were much sought after at the meetings of the trade this week. Orders were, however, anything but numerous, and it was difficult to secure prices that left a profit. Galvanised sheets are lower now by 8*l.* than when quotations were at the maximum. The Coal Trade is without change upon the week.

The members of the iron trade on 'Change in Birmingham to-day expressed satisfaction at the moderate course pursued by the Mayor of that town, as arbitrator in succession to his brother, the President of the Board of Trade. By his award to-day he ruled that the wages should be as many shillings as the bars of selected firms have sold for pounds sterling, plus 6d. per ton. This 6d. is just half what the men had demanded. The scale will come into operation on July 5, and an inspection of the selected employers' books will begin directly.

Two failures have taken place this week in the local iron trade. On behalf of Mr. Joseph Jones, of the Church Lane Ironworks, Tipton, and of West Bromwich, a petition in liquidation has been filed in the Oldbury County Court. The liabilities are stated at about 16,000*l.*, but the assets are not yet ascertained. Messrs. Duignan, Lewis, and Co., of Walsall, are the solicitors for the petition, and Messrs. Hatton and Muras, accountants, Wolverhampton, are the receivers. A first meeting of the creditors of Messrs. J. J. Bowater and Sons, Bush Farm Ironworks, West Bromwich, has been held. From the receiver's report it appears that the senior partner died in November last, and that since then his two sons had worked hard to carry on the business. The liabilities totalled 16,219*l.*, of which 8153*l.* were unsecured. The net available assets amounted to 1973*l.* The failure was attributed to the depressed state of trade and bad debts which had been incurred, amounting to 4000*l.* The debtors regretted that they could not offer a composition of more than 2s. or 2s. 6d. in 1*l.* This was declined, and it was determined to wind up the estate in liquidation. Trustees and a committee of inspection were appointed.

The Mill and Forge Wages Board, with Mr. R. Chamberlain, of Birmingham, as the new President, considered the basis for the new sliding scale on Tuesday. After hearing proposals by the masters and the men the President reserved his decision.

A strenuous effort is just now being made to whip up unionism amongst the colliers of South Staffordshire. A series of meetings has been arranged for, which are to be addressed by Mr, Thos. Halliday, formerly the President of the National Amalgamated Association of Miners. Speaking at Willenhall this week, Mr. Halliday said that in a little district in North Staffordshire there were now about 1000 unionists, in the Darlaston disirict 1000, in the West Bromwich district 500 or 600, and in the Cannock Chase district 600 unionists. In South Staffordshire the aggregate earnings of men working by the stent were about 3s. or 3s. 4½d., and by the day 3s. 6d. He declared, for the first time in three years, the sliding scales were a fallacious mode of getting more money; the quantities of coal produced must be brought below the demand to secure better prices.

Messrs. Joshua Wilkinson and Sons, vice and anvil manufacturers, Queen's Cross, Dudley, have received a second-class prize for smiths' anvils, stands, and vices, at the Sydney Exhibition, and a third-class for iron and steel. Messrs. John Rigby and Sons, of the Britannia and New Britannia Works, Wednesbury, have been awarded first prize at the late International Exhibition for their display of axles and springs. Messrs. S. Allcock and Co., Standard Works, Redditch, have received a gold medal and diploma, together with the prize of honour (a gold medal in the form of a fish, presented by the town of Aschaffenburg), for their exhibition of fishing tackle shown at the Fishery Exhibition at Wurzburg, Germany. Messrs. Allcock and Co. are the only English exhibitors who have obtained honours at this exhibition.

The Pelsall Coal and Iron Company's annual meeting was held at the Queen's Hotel, Birmingham, on Thursday, under the presidency of Mr. G. W. Hastings, M.P. In their report the directors stated that in the last half year there was a net profit of 8829*l.* 14s. 8d., partly due to the higher prices, and partly to improved management and increased out-put both in coal and finished iron. The profit was at the rate of rather more than 10 per cent. per annum, and the directors proposed to pay a dividend at the rate of 5 per cent. per annum on the half-year, carrying forward a balance of 3517*l.* 8s. 10d. to the next account.

## THE TRADE OF THE TYNE AND WEAR.

*June* 16.—The Steam Coal Trade continues strong, and is well maintained. Several Dutch East Indiamen have been loading at the Northumberland Dock, and more are expected. Steam coal continues to sell more freely. The quotation for best steam coal is about 9s. 6d. per ton. If there is any divergence from this quotation it is in discounts. The second-class steamworks, also, on the Wansbeck and the north part of the field, have a fair prospect at present. The Durham coke and second-class coals are selling for the Baltic, and this trade is improving, which shows that these coals are competing successfully with the German coal fields. The demand for steam small coal is also improving. The shipment of coal at Tyne Dock is also fully up to the average, and large shipments of pig-iron have been made to Cronstadt and other foreign ports. Most of the Durham collieries are fairly employed, with some exceptions. The gas coal works, of course, are fairly well employed in supplying contracts, and coking coal works are also generally fairly employed. The Durham colliery mechanics have been agitating for some time for a reduction in their working hours; in fact, for a return to the nine-hours system, which was adopted a few years ago during the coal famine, but afterwards discarded. The masters have agreed to refer the matter to arbitration. Mr. Thomas Douglas and Mr. S. B. Coxon have been nominated to represent the coalowners, and Mr. Wm. Crawford and Mr. G. Dover have been appointed on behalf of the men. The coalowners claim that if a return is made to the nine-hours system a concessien in the wages of the men should be made; and, on the other hand, the men state that when the extra hour was put on no rise in wages took place, and consequently the coalowners cannot claim a concession in wages if the extra hour is taken off.

It appears that English competition in the coal markets is keenly felt not only by the Germans in the Baltic, but also by the French in that country. The Western Railway of France has given a contract to Burnhope Colliery in West Durham for 40,000 tons at 16 frs. 46 c., delivered at Dieppe, and 3500 tons at 19 frs. 90 c. at St. Malo and Honfleur. In Belgium, too, by a decision of M. Saintelette, the Flanders Railway will no longer be able to draw their supplies of coal from Hainault at reduced fares on the States lines, and English coal will be in increased demand for the West Flanders and Ghent Terneugen railways. Although there is a good deal of work on hand at most of the engine works and factories, foundries, &c., they are certainly not with some exceptions fully employed. Some new orders for marine engines have been received lately on the Tyne, and a large order for locomotive engines for the Midland Railway has been secured by the celebrated works known by the honoured name of Stephenson. The general trade of the district has improved perceptibly of late, but yet there is not full employment either for the varioxs works or for the men.

PROFESSOR OF MINING.—The desirability of teaching practical mining in this district having been brought before the council of the College of Physical Science by gentlemen connected with the local trade of the district, it has been decided that a Professor of Mining should be appointed for three years. His salary is to be provided in equal portions by the funds of the College and by a subscription from the coal trades of Northumberland and Durham. The course of study will embrace the modes of discovery and winning minerals, the ventilation of mines, underground haulage, and all the elements

of a sound practical mining education; and we understand that Mr. John H. Merivale, a practical mining engineer of some experience in English and foreign mines, has received the appointment.

The chemical trade is to a great extent a puzzle, but this remark applies to many trades at present, a large business continuing to be done, and very small stocks are held, yet prices keep extremely low. It would appear that the competition is so close in all trades that it becomes a difficult matter to get remunerative rates for any article, either crude or manufactured. Chemical works are, however, fully employed at present.

The ironmasters of Cumberland have given notice of a reduction of 20 per cent. in the wages of furnacemen, and the men intend to resist the reduction; indeed, the men came out at several of the works on Saturday, and a general strike in the district is likely to take place at present.

A petition of the Tees Side Iron and Engine Works Company (Limited), for a reduction of capital was heard on Saturday by the Master of the Rolls. Mr. Buckley, who was counsel for the petitioner, stated that the company was incorporated in 1865, out of the business of Hopkins, Gilkes, and Co., and carried on a large and successful trade for many years; but in consequence of depression in the iron trade they last year passed a resolution for winding-up voluntarily. In fact, however, they ought not to have stopped, as they were solvent at the time. The Court, in compliance with the resolution and a subsequent petition, granted an order for winding-up. The trade in iron has since revived, and the business was prosperous, and the shareholders now desired to go on, and passed resolutions to that effect. They desired also to reduce the capital, and asked the Court to sanction it. The Master of the Rolls granted the petition.

## REPORT FROM NOTTINGHAMSHIRE.

*June* 17.—The decline in the iron trade in most districts has not as yet made any perceptible difference as regards Nottinghamshire, where the production of pig has so far been kept up to the average. It is true that stocks get larger, but hopes are entertained that these will be sensibly decreased, now that prices are likely to be less oscillating than they have been, and consumers have more confidence as to the future than they have had. A good deal of stone continues to be imported from Northamptonshire, which appears to be the great depot for supplying the works in the Midland field. Orders being received for raw iron are of limited extent, and the mills have not been running so well, inquiries for bars and merchant iron generally being, as a rule, for small quantities only. Puddlers and mill-hands are, thererore, anything but well off, taken altogether. Some of the foundries are tolerably well off, but even this department, which ought to be busy now is, like the others, quiet as a rule. Some air-compressing machines have been turned out, and for which one firm has a high reputation; but the demand of late has been very quiet, as colliery owners in particular have been curtailing their expenditure in every way, owing to the depression in the trade, which does not admit of any outlay that is not absolutely necessary. Many of the collieries are not working more than three days a week, and some few four days. The falling off has been principally confined to house coal, for which the demand has for some time been gradually growing less. The advantageous position of the collieries in the county as regards the Metropolis has been of great benefit, for several of them have done what may be called a good business there for the season.

From the Annesley Colliery only last month upwards of 8000 tons of coal were sent to the Metropolis, principally over the Midland Railway, whilst 5000 tons were forwarded from Bestwood, and 3000 tons from Newstead, the estate that at one time belonged to Byron, who never dreamt that the property would become so valuable from its wealth of "black diamonds." Linby, in the Nottingham district, belonging to the Linby Coal Company, has cultivated a good metropolitan trade, and last month was able to send upwards of 9000 tons within the area of the City dues. From Shireoaks, the well-known colliery which was the first to penetrate through the magnesian limestone, a moderate business only has been done with London, but the place is well situate for consigning to the Humber. Hard or steam coal sells more easily than it did, a good deal being used at the furnaces as well as for locomotive purposes. As regards other descriptions of coal there has been no change that can be quoted. Land sales have been but moderate either for household use or for manufacturing.

## REPORT FROM DERBYSHIRE AND YORKSHIRE.

*June* 17.—Trade here is in no way improved at the mines or works in Derbyshire since last notice, and in some districts there are a considerable number of workmen entirely unemployed. The summer promises to be a particularly quiet one so far as coal mining is concerned, seeing that the demand is gradually lessening, whilst sales can only be effected at prices which leave no profit whatever. This is most particularly the case with respect to house coal, which has become a stranger in most markets, so much heavier is the production than the consumption. The business doing with the Metropolis has kept up tolerably well for the season, but the price at which coal is placed in the cellars of the consumers, Silkstone being delivered as low as 20s. per ton. Steam coal has been in better request, but there has been no improvement with respect to engine fuel, Coke makers have been doing a steady business for the Sheffield as well as other districts, whilst a good deal is used in the localities where it is produced. At the works engaged in the making of pig there has been no change, the production being kept up, but stocks are increasing, there being an evident unwillingness on the part of manufacturers to order for anything but immediate delivery, and that only to the extent of keeping their establishments going, Price of pig, however, appears to be as low as it can well be expected to be, but there are many who believe it will see a still lower point, The Derbyshire pig, it may be said, is superior to what is produced in some other districts, for the principal portion of the stone used comes from Northamptonshire, and the stone of the oolites is admitted to be much better than that from the coal measures. In rolled iron the demand is still somewhat moderate, and the mills for a long time have been anything but brisk. The foundries, too, have not been so well employed as could be desired. There has, however, been a steady output of steel rails at Dronfield, where is the oldest works in the county, that of the Messrs. Lucas, so well known for their malleable castings.

In Sheffield there has been a falling off in some branches of the staple trade of the town, but it has not led to any number of workmen being discharged, there being a feeling that the quietness is of but a temporary character. Considerable stocks of pig are held by some of the largest makers, and prices are not quite so firm as could be desired. Most of the mills have been kept running fairly, there being plenty apparently to do in particular in ordinary ship and other plates. In armour plates there has not been so much doing, but the demand for the composite ones is sure to increase. Bessemer rails are still in fair request, but there is not the same amount of activity with respect to them that there was a short time since, notwithstanding the reduction in the price. For Bessemer steel itself there has been a decline, large stocks being held and offered at lower rates. Some season manufactures, such as sheep-shears, are being largely produced by the principal makers, orders having been better than in former years, and with the introduction of machinery makers are able to produce them at a much less cost than formerly, and so compete with the American and other producers, whose cheaper goods at one time were taken in preference to the better but dearer English-made goods. A fair business is doing in table and other cutlery and edge tools, America taking rather extensively from us just now. File-makers have been more fully employed, and the same may be said with respect to engineers and machinists and agricultural implement makers. At the foundries business is still quiet, builders' material, in the shape of grates, stoves, piping, &c., being still in but moderate request. In crucible steel there appears to be more doing by the leading firms, and even increased activity is now looked forward to, as a great deal is now being used for structural purposes. Steel plates are also being more extensively produced for ships as well as boilers. Boiler-makers have been by no means busy, but railway wagon builders have been working well.

The South Yorkshire Coal Trade is still in a most unsatisfactory state, and the colliers are still working short time, and likely to continue to do so. Not only is there little doing in house coal, but prices are so exceptionally low that the wonder is the pits are kept going, seeing that such can only be done at a serious loss to the owners. One firm has already succumbed to the force of circumstances—Messrs. E. Sutcliffe and Sons, of Havercroft. Much sympathy is felt for the parties, the senior member of it being the oldest person in the district connected with the trade. Hard coal, it may be said, still sells freely, a good deal being sent to the Humber for shipment to the North of Europe, but, as usual at this time of year, there is not so much doing in gas coal. Coke continues in request, and many ovens are being erected to meet the increasing demand.

## REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

*June* 17.—The works of the Wood Fibre Gunpowder Company in Glyn Ceiriog were last week bought by the Glyn Ceiriog Greenstone, or as they prefer to call themselves, Granite Company, who intend to use and adapt the buildings and powerful turbines already erected, to the purpose of making paving setts. The machine-houses are situated near the quarry, and will add greatly to its value and productiveness. The men at these quarries are employed full time, and form a pleasant contrast to the work at the Cambrian and the late Wynne slate quarries, in the former of which the men have three days a week. The Llangynog or Rhiworth Slate Quarry, after being in for the most part profitable work for the last 150 years, has come to a standstill, owing it is believed to no intrinsic fault in the quarry, the slates from which are known and prized all over the kingdom. When will the long-talked-of narrow guage railway be made from Oswestry up to Llangynog, and thus once more revive the mining industries of this district, whose valuable mines and quarries are now lying idle, being unable to cope with some 20 miles of land carriage to Porthywaen. The North Wales slate trade continues very dull. The work at many of the smaller quarries has been entirely suspended, while at the larger ones the men only work four days a week.

At the Queen of the Mountain Mine, Halkin, a rich deposit of galena has been met with, and it is hoped that it may prove a large and continuous one. The lead ore is found in large lumps weighing from 2 to 2½ cwts., which are found embedded in a dark red clay. The Halkin Mountain Drainage Scheme is not so beneficial as at first appears, or rather it is too effective in getting rid of the water, for not only does it take the water from the bottom of the pits, which can well be spared, but it drains away the surface water also, which cannot be spared at all. The mountain is so riddled with pits, cracks, and fissures that the surface water is carried away as fast as it falls, and it is a matter of extreme difficulty to retain sufficient water for dressing the ore. Many of the mines are obliged to cart their ore to considerable distances in order to wash it, and it is feared that the drainage scheme will drain them of what little they have now.

In Cardiganshire the exploratory works at the Bryndyfi Mine, near Glandovey, continue to be very satisfactory. In one shaft which is being sunk and is now some 7 yards deep, the ore averages 4 in. thick of solid lead; in many places it is 7 in. wide. This has continued from the surface, and shows every sign of being continuous to a great depth. A man at the Brynbo Colliery, Wrexham, has been fined for having three pipes and some tobacco in his possession underground. This man coolly stated before the Court that he did not use the three at once. The only way to treat men like this is to make them feel the power of the law, and to make such an example of them that their fellow-workmen will fight shy of falling into the same error.

With regard to the letter of "Caractacus" in last week's Journal, the point of the argument is, not that there are no copper lodes to be found in the older and underlying strata, but that there are none in the newer strata filling up the hollows and troughs of the older. With regard to the meaning of the word anticlinal, "Caractacus" is advised to search in some geological hand-book or mining glossary for its true definition.

## REPORT FROM MONMOUTHSHIRE AND SOUTH WALES.

*June* 17.—The Midland Railway Company, it appears, will oppose the Great Western in the House of Lords Committee in the latter's Bill for the absolute purchase of the Monmouthshire line. When the Bill came before the Commons Committee facilities were granted to the Midland with which they are not satisfied.

The Iron Trade of the district shows evidences of a slight improvement. The market has slightly improved, and there is no doubt that the district will be the first to feel the benefit. As it is, there are some fair enquiries afoot, and these seem likely to lead to business. Masters are not over anxious to take orders at present rates, having the belief that times will shortly alter for the better. Clearances have not been quite so large during the past few days, and have been mainly of course to the United States. Shipments to that quarter seem to be diminishing, The enquiry for rail iron has been rather slow, but for Bessemer steel tolerably good enquiry exists. Merchant iron is in fair request, and bars are used up well in local requirements. Prices are materially unchanged, but those for pig-iron have an upward tendency. In consequence of the furnacemen at Maesteg being dissatisfied with the terms under which they are being employed, work has been suspended at the works and at the collieries belonging to the Llynvi and Tondu Company at the place named. Several hundred men have been thrown out of employ. The Tin-plate Trade has not materially changed.

The Coal Industry has been fairly active, and shipments have been quite up to the average. There have been enquiry for steam qualities, and the foreign demand is good. The complaint is still as to the lowness of prices, which seem to be irretrievably stationary. House coals are rather quiet, but considering the time of year business is moderately good. As will be seen by figures which follow, coal shipments last month were not so large as those in the corresponding period of last year. The double shift system has been discontinued at Cyfarthfa. Sinking operations have been commenced at the Cwm New Pit, Mr. Thomas Jenkins, of Cwmaman, being the contractor. The patent fuel department is rather slow. The coke department is tolerably active. At the Tynewydd Colliery 30 new coke ovens have been nearly completed.

In the Ebbw Vale Steel, Iron, and Coal Company's (Limited) report for the year ending March 31 the directors state that during the greater part of the financial year the selling prices of coal, iron, and steel were very low, and the advance in the prices of iron and steel, which commenced in the autumn of 1879, has latterly been almost entirely lost. Notwithstanding these facts, the directors state that have pleasure in being enabled to report that the operations of the company during the year resulted in a profit (after providing interest on debentures, &c.) of 33,814*l.* 14s. 7d. The gross profits amounted to 75,137*l.* 19s. 1d., from which had to be deducted 7762*l.* for expenses of head office, &c., and 33,500*l.* for interest on debentures and fully paid-up shares, making in all 41,323*l.*, and leaving a balance of profit of 33,814*l.* 14s. 7d. It has not been necessary to take anything from the reserve fund set aside by the shareholders' committee of 1875 to cover loss in work or depreciation in the value of stocks, but as the directors deem it desirable to close these accounts, they have resolved to appropriate the balances thereon (1) to reducing the value of the debentures and railway shares held by the company to such as they believe they could be sold for, and (2) to writing off 22,028*l.* as depreciation in the value of the property. The first and second mortgages, amounting to 70,000*l.*, have been cleared off, and the debenture bonds now constitute the first charge on the property of the company. The directors do not think it desirable to pay a dividend out of the available profit. In the balance-sheet there is a note intimating that 60,000*l.* of debentures have been deposited as security against amounts included in open accounts. "The fact is," add the directors, "the company has for many years overdrawn its banking accounts, and the directors, having got rid of the incubus of the first and second mortgages, and entered into a scheme for the repayment of the debentures which, under the trustees, has so far worked to their entire satisfaction, have determined to ask the shareholders to postpone any division of profits which may be earned until these bank balances are wholly extinguished or placed on a more satisfactory footing."

The Rhymney Iron Company (Limited) will recommend (subject to audit) a dividend of 1*l.* per share on the 50*l.* shares, and of 6s. per share on the 15*l.* shares, free of income tax, payable on July 21.

Last month Newport shipped 18,352 tons of iron; Cardiff, 17,260 tons of iron; and Swansea, 1259 tons. Cardiff cleared no less than 12,000 tons of rails to New York. In May last, also, Cardiff shipped to foreign ports no less than 406,558 tons of coal, compared with 432,289 tons in the same month of 1879; Newport, 91,068 tons, against 101,415 tons; Swansea, 62,110 tons, agrinst 61,410 tons; and Llanelly, 5752 tons, against 6201 tons. Coastwise shipments during the same period were—Cardiff, 75,801 tons, against 69,096 tons; Newport, 74,947 tons, against 89,487 tons; Swansea, 56,966 tons, against 54,143 tons; and Llanelly, 14,054 tons, against 12,591 tons. Last month. also, Cardiff shipped 8803 tons of patent fuel, and Swansea, 18,105 tons.

It is understood that Mr. Llewelyn Llewelyn, the general colliery manager under the London and South Wales Coal Company has accepted an excellent appointment in Chili, South America.

The Gilwern Tinworks, Cwmtwrch, were opened last week amid great rejoicing and enthusiasm. The engine (which was started by Mr. Evans, the secretary) is a vertical one, 4 ft. stroke, 35 ft diameter, and direct-acting, and was supplied by the firm of Mr. Nevill, Llanelly, and works most satisfactorily. The erection of the engine has been carried out under the supervision of Mr. Richards, foreman in the employ of Mr. Nevill; Mr. David Howells, of Ystalyfera, being the contractor. After the start the company provided refreshments for all engaged at the works, and the chair having been taken by Rev. Charles Williams, who delivered an address upon "Masters and Workmen," the usual toasts were given.

# Meetings of Public Companies.

## NOUVEAU MONDE GOLD MINING COMPANY.

An extraordinary general meeting of shareholders was held at the Exchange Chambers, George-yard, on Monday,

Lord RICHARD BROWNE, one of the London committee, presiding.

The CHAIRMAN said the company was formed under a law which was very little known in England—the French law of commandite. The shares were all to bearer, and the only way, therefore, in which the gérant could make known that there was to be a public meeting was by, as far as possible, sending a notice to those shareholders who had had their shares *visé*. He was very glad to see such a large assembly. The report had only been put in type a few hours before the meeting, and, therefore, it would be for the shareholders to say whether they would have it read at length, or whether they would be content for him to comment upon it as he went along.

It was decided to take the report as read.

The CHAIRMAN went on to say that by the law of commandite the liability of each member was strictly limited to the amount which he held on his shares; therefore, there was no further liability, as the shares were issued fully paid. The general management of the company rested with the gérant, who was assisted, or rather controlled, by the Conseil de Surveillance. The head quarters of the Conseil were in Paris; there was also a London committee, composed of certain members of the Conseil resident in London. This was not an ordinary meeting. The ordinary meeting would take place in Paris (where the ordinary meetings must take place) about two months hence, at which meeting the accounts of the gérant up to date would be presented, and, if adopted, would be sent over to London, where they would be at the disposal of the shareholders at the office. This meeting was called because the gérant was anxious that the English shareholders should receive early information of what he had done, and what he intended to do, in the matter of the acquisition of the new property, which would give, as was confidently hoped, a new value to the many shares of the company, which had laid dormant so many years. For some years the gérant had devoted his attention to the gold fields of Venezuela, but it was only in the middle of last year that he received information which he considered sufficiently reliable to send out an expedition to explore. The expedition was placed in the hands of Messrs. John Taylor and Sons, the eminent mining engineers, and they deputed Mr. Charles Oxland to proceed to Venezuela. Mr. Oxland returned, and made an elaborate report on the property, and the result of the consultation of the gérant with Messrs. Taylor was that Mr. Oxland was sent out again in January last, with full power for further investigation. This further investigation confirmed his previous investigation, and led him to conclude the purchase of that property. The machinery was all in excellent order. There were mentioned 50 heads of stamps whereas in reality there were 60, which were in efficient working order. There were also detailed statements of buildings and machinery. In page 4 was a statement of the richness of the auriferous district in Venezuela, which, it is stated, may be found in the statement of the working and results of 14 mining companies from 1868 to August, 1879, and it is stated that of these one magnificent mine of Callao stands at the head of the list; its produce having amounted to 244,321 ozs. of gold, whilst the second mine was the Nacupai, which was the mine which the gérant was now in treaty for purchasing, and which, in fact, he had concluded to purchase all but the payment of the money. In that mine up to April, 1878, 104,138 ozs. of gold had actually been produced and sent to market. Mr. Taylor confirmed the statement of Mr. Oxland that this was a true fissure vein, "the auriferous quartz of which it is composed has yielded from 2 to 3 ozs. of gold per ton in the working hitherto made, and it will be found much richer at a great depth, as such has been the case in a remarkable degree in other mines in the district." That was a matter to a certain degree of speculation, but which they were justified in asserting, because the actual results attained in other mines had led to that conclusion—that the deeper they went down the richer the ore. The report went on to state the opinion that with 60 stamps at work, and under the able management and superintendence of Mr. Oxland, the machinery of the Nacupai would be able to crush 100 tons a day, and taking as a basis the average yield from 2 to 3 ozs. per ton, the daily produce would be 250 ozs., equal to 100*l.* a day. This was an estimate, but he hoped it would be approximately reached, and then the success of the company would be certain. On his last letter to the mine Mr. Oxland reported on the work which had been done. He had put the whole place in proper order and repair, and the engines and boilers had also been put in thorough good order, and on May 8 the directors were led to believe that he was now ready to commence real mining operations, together with crushing and preparing the ore for the market. The directors had received intelligence of the value of the mine from other sources, besides the gentleman who was sent out to report upon it. Mr. Liccioni, the president of the Callao Mine, in a letter addressed to the gérant of the Nouveau Monde Company, and dated April 6, 1880, said—"I know well the Nacupai Mine; there are three lodes, rich, of which one only is sufficient to make the fortune of the Nouveau Monde." There was another gentleman who had been employed independently in that neighbourhood who had confirmed all the statements made. On page 5 of the report the question was asked—"Why the Nacupai Mine, which has produced 104,138·94 ozs., and which is a true fissure vein, has been sold for 60,000*l.* only?" He would not go into details except to say that although earning considerable profits, those profits were spent to a great extent in exploring other mines—in fact, the owners tried to work on too large a scale, and got into difficulties, and borrowed money, and the mortgagee foreclosed, and at the moment of Mr. Oxland's arrival the property was for sale, and he was able to conclude the bargain upon the spot. That was the reason why this company had acquired the property at what seemed to be a low estimate. The payment for the mine was to be made in Venezuela on July 6. The amount to be paid for it was 60,000*l.*, and that amount had to be provided and sent out between now and that date. The gérant now proposed to issue 80,000 shares of 1*l.* each, making an amount of 80,000*l.*; of this 60,000*l.* would be employed in the purchase of the mine, properties, &c., whilst the remainder would form a working capital as required, which was but a slight addition to the capital, and would interfere very little with the dividend they would receive. He might mention, for the information of many of the shareholders who might wish to know, that the original capital of the company consisted of 200,000 shares of 1*l.* each: and when the gérant had it in contemplation to purchase this property, numerous advertisements were inserted in the papers calling upon the shareholders to send in their shares for registration, and to be *visé*, and up to the present moment the total number of shares received for that purpose was 93,300, leaving a balance of 107,000 not yet claimed, and it was out of that balance that the gérant proposed to issue the 80,000 shares. In the question of registrating the shares, the gérant had acted in accordance with both French and English law, and had taken every step for notifying the fact of the revival of the company. There might be some who had not heard of it, and consequently had not sent in their shares to be *visé*, but as the shares were payable to bearer it was impossible for the administration to give a separate notice to each shareholder, as their names were not known. Appended to the report was the report of Messrs. John Taylor and Sons, but it was unnecessary to make any remarks upon it, as Mr. Richard Taylor was present, and would be happy to answer any question.

Mr. ROBERT BEDFORD expressed a strong hope that some arrangement would be made to *visé* the shares of those shareholders who for living at a distance or for other causes had not yet heard of this proposal. He instanced the case of his own brother, who was now in New Zealand, and had held the shares for about 25 years, during which time the mine had lain dormant.

Mr. LANDOR suggested that the mine should be formed into an English debenture company, and that debentures should be issued terminable at a certain time.

Mr. SCHOLFIELD questioned whether the gérant had the power to forfeit shares in the way proposed. He also asked whether the law of commandite protected shareholders in England? He had got confidence in Messrs. John Taylor and Sons, and believed the gérant had made a good purchase, but he should certainly like to be satisfied on the two points he had raised.

Mr. GLASSPOOLE said that more than 20 years ago he attended two or three meetings of the company at the London Tavern, and then he heard no more of the company, and had thrown his shares into the market years ago, believing them to be worthless, and he expected many shareholders had done the same.

Mr. SCHOLFIELD said there was no doubt that there was considerable dissatisfaction amongst the shareholders, and he suggested that a committee should be appointed, and their conclusion submitted to a meeting of shareholders.

Mr. VALLANCE (solicitor) said that many years ago it was considered a great advantage that this company should be constituted under the law of commandite in France, and the advantage of the law had been abundantly proved by the disasters of shareholders in this country, who had held shares in certain companies where their liabilities was not limited. There was no possibility under the French law of commandite of the English shareholders being made liable for one penny beyond the amount paid up on their shares. Therefore, whether or not the company should be an English company must rest with the shareholders themselves. As regarded the forfeiture of the shares, the gérant had full power, with the permission of the committee of supervision, to make any rules or regulations he liked, but he could do nothing which could derogate from the rights of the shareholders. The Conseil de Surveillance had the right to prescribe certain conditions which should be done in reference to the company, and, of course, if shareholders did not comply with such conditions they ran a chance of having their shares forfeited. As regarded the forfeiture of shares, the gérant thought it was to the interest of those who possessed shares that the capital should be limited to the fullest possible extent. He understood from the Chairman that at the approaching meeting at Paris the shareholders would have an opportunity of sending in shares within a given time; but what the committee had done was to endeavour to ascertain what amount of capital was represented here and in Paris, and they found it, in round numbers, about 100,000*l*. He mentioned that he himself was formerly a shareholder, but, like the gentleman who had spoken from the body of the room, he destroyed his shares years ago, believing they would never be of any value. No doubt it would be hard to deprive a shareholder of the opportunity of sending in his shares, but that was a question which might be safely left to the committee to consider.

The CHAIRMAN said there seemed to be a feeling on the part of some of the shareholders that some wrong would be done to them; he might say that the President of the Conseil de Surveillance had intimated that at the general assembly of the company in Paris a resolution would be proposed by the gérant, and laid before them, requesting them to reconsider their decision, and admit a certain number of shares, under certain restrictions, which would have to be made to *visé* these shares. Some gentlemen also seemed to think that the company would be better under English law, but he pointed out that if the company had been under English law it would never have been kept alive all this time, but would in all probability have been in liquidation years ago. The conseil had taken every means in their power to make the shareholders acquainted with what was about to be done, and in order to fix the position of the company it was absolutely necessary to fix some date for the revision of the shares. The new issue of shares would first be offered to the existing shareholders at par, and he hoped the steps now being taken would raise the value of the existing shares. Under any circumstances the rights of the shareholders in their property had been maintained, which probably would not have been the case under an English company.

Mr. SCHOLFIELD proposed that the gérant be advised to recommend, at the meeting to be held in Paris shortly, that all those who present their shares to be *visé* on or before a certain date should be allowed to do so.——The CHAIRMAN said that was proposed to be done.

The CHAIRMAN, in answer to a SHAREHOLDER, said the allotment of shares would be *pro rata* on the production of certificates.

Mr. ASTON asked whether the Nacupai property was not a mine which had already caused a great deal of loss to persons in New York? He stated that the mine had been offered at half the sum of money now proposed to be given for it.

Mr. ASTON said he was a brother of the preceeding speaker, and caused much merriment by asking the meeting to receive with great caution what his brother had said regarding the mine having been offered at half price. He went on to say that there were operators for the fall as well as the rise on the Stock Exchange, and, therefore, unauthenticated statements should be received with very great caution. For his own part he had the most perfect confidence in the gentleman who brought this matter forward, and also in the value of the property, and he mentioned that the Stock Exchange committee had investigated the case thoroughly, and had granted a re-quotation of the shares, which had been struck out of the list some years ago.

Mr. VALLANCE, in reply to an observation, said there was no doubt whatever that the necessary capital would be found, even if the shareholders refused to find it.

Mr. RICHARD TAYLOR said that himself and partners were present to-day, not to take any part in the discussion with respect to the constitution of the company, but simply as mining engineers. His firm held the position of engineers to the Nouveau Monde Mining Company when it was first started in 1851. The operations of the company in the few years succeeding its foundation were altogether unfortunate and unsuccessful. Those operations were in California, the quartz veins (or reefs as they were now called), which were purchased having turned out to be worthless. The gérant, under the powers which he possessed of working mines in all parts of the world, then worked a mine in Guatemala, which also proved unfortunate. After that time the company disappeared altogether, and he supposed it had collapsed, and was to be forgotten, and the shares held by his brother and himself were, he believed, destroyed as waste paper. At the present time his firm did not hold a share, nor had they bought or sold a share during the recent excitement. On the strength of his firm's connection with the old company, they were asked by the gérant to afford him aid in resuscitating the company, the gérant having kept the company alive by complying with the requirements of the French law, such as paying certain annual taxes and fulfilling certain formalities. His firm had had the mine examined by an agent of their own choice. When he heard where the property was situated he knew at once it was in a district of gold mining where some of the mines had given extraordinary results, and gave great promise of future riches. They selected to inspect the mine Mr. Oxland, who had had great and varied experience in gold mining. Mr. Oxland's report had been published. It was clear, and was one which the shareholders could understand and appreciate. To his firm Mr. Oxland was able to give fuller details and explanations, and after a careful examination of the whole of the evidence his firm came to the conclusion that this was a property of extraordinary value, and one which they could recommend to this company to acquire if possible. (Cheers.) It had been spoken of as a mine; it was really the whole of the mineral property of the Orinoco Exploring Company. The property included 10 concessions, interspersed in the richest part of that particular district of Venezuela, situated on the banks of the Yuruari river, which gave an abundant supply of water for washing the gold. The 10 concessions comprised 1450 acres, though he did not mean to lay much upon acreage, for acreage in a metallic mine did not tell them much. The important point was what extent of run had they on the veins, lodes, or reefs? In this case the extent to which workings could be carried on was very great indeed. The extent to which they had been carried on up to the present time was comparatively small, being limited to the mine of Nacupai, which stood second in the list as regards the produce which had been obtained from it, the rich mine of Callao being at the head of that list. That produce had been certified by the British Consul at Bolivar, and had been taken from very shallow depths, and from two levels only, but judging from what had been done in the adjoining mine there was every reason to believe that the richness of the ore would increase very much in depth. He went on to point out that there were machinery and appliances for working already on the mine—in fact, it was fully equipped for working, thus differing in that important respect from almost all the mines brought before the public, inasmuch as active operations could be at once commenced, and the shareholders might expect that a great and valuable return would be at once coming in.

The Viscount de CAZE (the President) repeated the assurance of the Chairman that the Conseil de Surveillance would take into careful consideration the question regarding the forfeiture of the shares.

Mr. VALLANCE, in reply to a question, said the purchase money would be paid into Court in Venezuela.

The proceedings, which extended to a considerable length, closed with a vote of thanks to the Chairman.

## BLUE TENT CONSOLIDATED HYDRAULIC GOLD MINES OF CALIFORNIA

A meeting of shareholders was held at the offices of the company, Austinfriars, on Tuesday,

Mr. J. IRVING COURTENAY in the chair.

Mr. W. J. LAVINGTON (the secretary) read the notice calling the meeting.

The CHAIRMAN said: Gentlemen, since I had last the pleasure of addressing you I have paid another visit to California, and the company's property. I found that a considerable amount of work had been done in the interval that had elapsed from my previous visit, chiefly in the direction of Gopher Ravine, and we have now tested the value of the gravel clear across to the boundary of the property on that side. The yield of gold per miner's inch of water has been 51 cents—a less yield than in the previous year. I attribute this, in some degree, to a large portion of the workings having been confined to the gravel on the rim and extreme edge of the claim, but even working at this disadvantage the yield of 51 cents to the inch of water will compare favourably with the leading gravel deposits in the State. We are now working up the channel, and more towards its centre, and this for the future will be mainly the course of our operations. It is intended to work the Blue Lead claim also with any surplus water there may be, as that claim will, I think, when further opened up pay well; but for the sake of immediate profits our aim is to use as much water as possible on the South Yuba, and to keep that claim going day and night—a result that up to the present had not been accomplished. It has been a costly and protracted operation, extending over several years, to open the South Yuba claim, but with the improvements made by our new superintendent, Mr. G. S. Powers, we expect a bullion return this year in excess of anything we have yet had, and a corresponding increase in profits as estimated in the report of Mr. Thomas Price. The total of the bullion from South Yuba for 1879 is $102,429, or 21,837*l*. 11s., and the clean-up for May and part of April—about six weeks—including $6400 from Blue Lead claim, is $31,400, or 6400*l*. I inspected the canal, and found it, on the whole, in good condition, and substantial snow sheds had been erected since my last visit. This winter has been unprecedented in its severity in California—the severest since the country has been inhabited by white men—and, in common with other canals and railroads, the company's canal has suffered damage. We look forward to a long summer water season in consequence of the heaviness of the snow deposit in the Sierra Nevada, and also because of the arrangements made by Mr. Price and myself for an increased water supply. A new tunnel has been commenced, and good progress has been made. It is being driven by hand-labour, and was in 242 ft. on May 1, 64 ft. having been made during the month of April. This tunnel is, in fact, a huge sewer to carry off the tailings and water into the river. It will be finished in about 18 months, and will suffice for its purpose for many years to come. You will remember that I alluded at previous meetings to the quarrel which had taken place between a few of the farmers and the miners on the debris question, and I then said that I felt confident the practical sense of the Californians would lead to a compromise or the adoption of a plan by the State for the protection of both interests. This view has proved correct, for after the farmers had tried litigation (which could benefit nobody except some hungry lawyers), and had been beaten in the Courts, the Legislature of California in April last passed an Act whereby a tax will be levied amounting to one-twentieth of 1 per cent. upon the assessed value of all property in the State, in addition to which the miners will have to pay half a cent on every miner's inch of water used. This rate will fall quite light on all parties, and will be of great benefit to the State generally. The money thus raised will be expended upon a comprehensive system of levees and embankments on the rivers affected by the tailings from the mines, and so important is it considered to be that no impediment should be thrown in the way of the production of gold in California, that I gather from the proceedings in Congress that it is probable that an appropriation for the same purpose will be granted by the United States. You may not be aware that the larger portion of the gold produced annually in California is got by the hydraulic method, and I commend to the perusal of those of you who feel a special interest in this subject the instructive article in the Pall Mall Gazette of the 7th inst. The accounts are made up to Dec. 31, 1879, since which there has been a considerable improvement in the financial position, as the whole of the bills payable (7750*l*.) have been duly met. The 10 per cent. debentures have been freely taken up, and those falling due on July 1 have been replaced at a reduction of 2 per cent. per annum in the rate of interest payable. There are debentures to the amount of 6900*l*. still unissued, but it is not the intention of the directors, subject, however, to the result of the season's work at the mines to issue the whole of them, but to keep a certain number in reserve. (Cheers.) I beg to move the adoption of the report and accounts.

A discussion ensued on the accounts and the position of the company, in which most of the shareholders present took part, and a very general opinion was expressed that the difficulties under which the company had hitherto laboured were at length overcome. The returns during the present year had been very satisfactory.

The report and accounts were adopted. The retiring directors and auditors were then re-elected, and the proceedings closed with a vote of thanks to the Chairman and directors.

## NEW WYE VALLEY LEAD MINING COMPANY.

The four-monthly meeting of shareholders was held at the offices of the company, Change-alley, on Monday,

Mr. J. B. TIPPETTS in the chair.

Mr. H. R. MOORE (secretary) read the notice calling the meeting.

The CHAIRMAN said—Gentlemen: Under the Act of Parliament regulating companies of this description it is necessary to have a meeting within four months after the construction of any company. We have met to-day for the purpose of complying with the Act of Parliament in that respect. If this were simply a new company I should have very little to say except to inform you of the completion of the formation of the company; but this is not a new company, but a reconstructed company—and it may be well that I should make a few remarks to you, and say something about the position and prospects of the company. I will not attempt to go into detail with respect to the position of the mine, for that is a subject which I shall leave to Mr. Kitto; but I will explain to you what the business position of the new company is, and will leave it to Mr. Kitto to explain to you the actual working condition of the mine, and our prospects as mining shareholders. You are aware we are, in fact, the child of the Wye Valley Company. The Wye Valley Company, with which most of our present shareholders were connected, held a meeting in November last, at which it was thought desirable that some reconstruction should take place—the fact being that further capital was required for the working of the mine, and a difficulty was found in raising it in the old company. It was, therefore, determined to reconstruct the company, and issue a certain number of new shares, giving the old shareholders certain privileges to induce them to come in. The old shareholders and debenture-holders of the company all assented to that arrangement, and at a meeting which was held on Dec. 16 the resolutions which had been passed at a previous meeting were duly confirmed. The first of those resolutions was—"That the leasehold interest, with the plant, machinery, and other effects of the company, be transferred to a new company, in consideration of the said new company undertaking all the debts and liabilities of this company, including costs of liquidation; allotting to the holders of debentures shares fully paid, representing 15*l*. for every 10*l*. debenture, in full of all claims for principal and interest, such shares to be guaranteed a preference dividend of 5 per cent. per annum out of the profits of each year, and to participate in any further profits which may remain for division after payment of a like dividend on the ordinary shares, such preference to cease when a dividend of 5*l*. per cent. per annum shall have been paid upon the ordinary shares for two consecutive years, and the allotment to the shareholders in this company of two 1*l*. fully-paid shares in the company for every 3*l*. share held by them." Other resolutions were also passed to the effect that the company be wound-up voluntarily, appointing a secretary, and authorising the liquidator to continue operations pending the transfer to the new company. He stated on that occasion that there was some question whether the debenture-holders would all come into that arrangement. As creditors they were in a different position to the shareholders; but, fortunately, it so happened that for the most part—indeed, he believed that, with one exception—all the debenture-holders were likewise shareholders in the mine, and they reasonably saw that it was to their interest to come into this arrangement, which protected their interests as shareholders as well as debenture-holders. With that solitary exception all the debenture-holders came into the arrangement, and had taken their shares in the company, and the shareholders had done the same, and the new shares, to the number of 10,500, had been allotted under the terms of the arrangement which were submitted to the shareholders of the Wye Valley at the meeting held on Jan. 30 last. The present meeting was held, as he had said, under the Act of Parliament, which required a meeting to be held within four months of the formation of a company. He would now call upon Mr. Kitto to read his report,

Mr. JOHN KITTO said he would read his report, and comment upon it as he went along. The report commenced by saying—"In handing you our report for the four-monthly meeting, to be held on Monday next, we have much pleasure in being able to confirm our previous statements with regard to the progress made in sinking the new shaft, from its commencement to the present time, and we are pleased to be able to say that the same satisfactory progress has been continued throughout, and that a communication has already been effected between the surface and the 22 fm. level below the deep adit—a depth of about 44 fathoms." He had the plans present, and should be happy to point out to any shareholder the shaft to which he referred. The report went on—"We have also sunk the same shaft 7 fms. below the 22 fm. level, towards the intermediate, and have completed the sinking from the intermediate to the 46—so that there only remains about 4 fms. to be got through between the 22 and intermediate levels to complete the sinking from top to bottom of the mine, and this we shall be able to finish in a month from this date." He might remark, with respect to that, they would finish that within a month. They were getting on more rapidly than he anticipated, and he believed they would get a communication through from top to bottom by the middle of next week, if not by the end of this.

Mr. DAVEY asked what was the original estimate for the sinking of the shaft?——Mr. KITTO said he originally estimated it would take twelve months to fairly get it into operation. Five months had now elapsed, and they would finish it and get it in operation well within the time estimated. But the shareholders must not suppose that when the communication was complete the shaft would all be complete, because there would be a great deal of work to do—such as timbering, and so on. At any rate, the work would be done well within the time, and that they would have two or three months to spare, and a great part of the money. The report went on—"There will then remain a great deal of squaring of ground to be done, as well as timbering, including dividing and casing the same, and laying skip-road for drawing the stuff from the bottom of mine to the adit level; but this will be more a question of materials than of labour, as it will require a large quantity of timber, but we hope to get it all completed and in full operation and the sinking commenced below the 46 fm. level in three months from this time; and, meanwhile, we shall be engaged in cross-cutting and proving the lode to full width, and in opening the ore ground for stopes." On that point he might mention he thought they were safe in completing the work in nine months at the very outside.

Mr. DAVEY asked how much would be saved from the original estimated outlay?——Mr. KITTO: The original estimate was 5000*l*.; but I do not think we shall spend more than half that. (Hear, hear.) They had got on faster than he had anticipated, and the diallings had come within an inch on every level; and, consequently, no time had been lost. The report went on—"Tippett's shaft is now down about 14 fms. below the adit level, and at the present rate of progress will communicate with the 22 fm. level in about three months. The mine will then be thoroughly ventilated throughout from top to bottom, and we shall be in a position to continue its development to the greatest possible advantage." He might mention that Tippett's shaft was a good way to the east of the new shaft—something like 100 fms.—and was a very important part of the mine. In driving the adit level they passed through a great deal of ore ground; but there had been no ventilation, and, consequently, the ground must remain as it was until a new level was driven through. When the shaft was communicated with the 22 fm. level the whole of that section of the mine would be ventilated. The report went on—"We have nothing new to report to you with regard to the ore-bearing portion of the lode, as little or no exploratory works have been carried on since the new shaft was commenced; but we shall be able to resume operations in the 46 in about another month, or as soon as the new shaft is finished between the 22 and 46 fm. levels, and the stuff which has accumulated removed. The tribute pitches in the shallow levels are still yielding fair quantities of ore, and are being worked at an average of 5*l*. per ton, at which price they will leave a good profit."

Mr. DAVEY: What do you mean by a "good profit?"——Mr. KITTO: Quite 3*l*. per ton. We get the whole of the fine ore, which is equal to the dressing cost. We give nothing of the slime to the tributers; they only get the crop and first washing.

A DIRECTOR said there was also the expense of carrying it to the railway.

Mr. KITTO said that only amounted to abqut 10s. per ton. He thought they could safely calculate on 3*l*. per ton profit.——Mr. G. ROSS: And that is in bad times like the present.

Mr. DAVEY asked what was the average price of lead?——Mr. KITTO: Certainly not less than 14*l*. per ton, and we are only getting 9*l*. per ton now.

Mr. DAVEY remarked that they did not seem to be getting much blende.

Mr. KITTO said they sold 150 tons of blende some time ago. There was a good deal of blende accumulated, but he did not know that it would be wise to turn it into money at present. If the mine were his own he should not sell either blende or lead just at present, for he was very much disposed to think they would get better prices before long. They were now selling at 9*l*. per ton precisely the same produce which they had formerly sold at 16*l*. per ton. In the conclusion of his report he stated—"We are looking forward with much pleasure to the completion of the new shaft, and are in hopes that by the time this is accomplished we shall be able to get a fair average price for our ores, in which case we have no fear of being able to pay all expenses out of the produce of the mine, and leave a very satisfactory profit to the shareholders." With regard to the third paragraph in his report, in which he stated he had nothing new to report with regard to the ore-bearing portion of the ground, he might mention that since the company was reconstructed, and a new shaft commenced, they had done little or no work towards the development of the lode, the chief object and aim having been to get the shaft through. In the meantime they had been driving the 46 fm. level in a straight course somewhere about the middle of the lode—so as soon as they got the stuff clear which had accumulated in the shaft they would cross-cut north and south. They were now in paying ground there, but he did not reckon for a moment that that was the richest part of the lode. The lode at that part was 60 ft. wide, and they were now carrying only 4 ft. wide in the driving.

Mr G. Ross: And I believe that it is worth about 25 cwts. in places?——Mr. KITTO said that was so. He would not undertake to say that the whole 60 feet were as good; but he believed there were many places in the 22, where they now now driving, which were very much richer. He might mention that by means of the new shaft they could now do as much in one year as they could formerly do in three.

Mr. G. Ross said there could be no doubt that Mr. Kitto had adopted the best and quickest mode of proving the mine.

Mr. DAVEY asked whether it would not be advisable to adopt boring machinery?——Mr. KITTO said it would not be an advantage at present, as the points of operation at present were short, and the object they had in view was too easily reached to warrant the expense of rock-boring machinery. Possibly the time might come when rock-boring machinery might be employed with advantage, but at present he was not prepared to recommend its adoption.

The CHAIRMAN, in reply to Mr. CAREW, said that in the reconstruction of the company the shareholders received one 2*l*. share for each existing 3*l*. share; the preference shareholders, to whom there was some amount of arrears due on their debentures, receiving one 15*l*. share in respect to every 10*l*. debenture. He might mention there were 4500*l*. preference shares, and these ceased to be preference shares, and became ordinary shares, when the company paid 5 per cent. for two years on the whole capital of the company.

Mr. CAREW: Have you no debentures now?——The CHAIRMAN: No debentures now—only the 4500*l*. of preference shares.

Mr. Ross, addressing Mr. Kitto, said he supposed there should be no difficulty, with lead at the present price, in paying a dividend of 5 per cent.?——Mr. KITTO said he should not like to promise that just at present; he would not say but what they might pay a small dividend, but he would not fix himself to any amount.

Mr. ROSS: You paid 7½ per cent. dividend in this company once before?——Mr. KITTO: Yes; and I hope to pay double that amount before long, but not with ore at 9*l*. per ton. I believe if any mine can pay with lead at the present price New Wye Valley can.

The SECRETARY, in reply to a question, said there was still 3000*l*. of capital to work with.——Mr. KITTO said there was also 450*l*. coming in for lead sold.

Mr. DAVEY: What can the tributers turn out per month?——Mr. KITTO said about 10 or 15 tons per month from the upper section of the mine. There was not a single stoping operation at work since the new shaft had been commenced. This was not altogether because of the low price of lead, but chiefly because they could not work the mine to the same advantage now as they could when the shaft was completed. Referring to the fluctuations in the price of lead he said they were sure to see the price rise again, and he was husbanding his resources until that rise came; and shareholders might go away feeling quite confident that the mine could pay a dividend with the price of lead a little better than at present.

A SHAREHOLDER: How much could you turn out?——Mr. KITTO said at least 50 tons per month, which, with an average price for lead, would enable them to pay a good dividend.

Mr. BEAUMONT (a large shareholder) said he visited the mine about six weeks since, and went underground. He had followed Mr. Kitto through his remarks on the ore ground, and thought he had given a very fair history of the rise and progress of the ore body. He had no doubt whatever they had a good mine. The indications at the 46 fm. level, and all the distances from there to surface, were such as seldom misled anyone. The lode had been more intermittent near surface, but had become more uniform in depth. If lead were 12*l*. per ton it would make a difference of 3*l*. per ton profit, which, at 50 tons per month, would yield 9 per cent.; but he should be very much disappointed if they did not get more than 9 per cent. dividend. The mine was looking extremely well, and the probability was they had a large width of ore ground at the 46 and above it, and also he hoped below it. The ore was dipping eastward, and the other was going straight down, and he had no doubt that in depth they would communicate. There was a large amount of blende, and it was generally found that the lighter sulphur metals overlaid the more valuable ones.

On the motion of the CHAIRMAN, seconded by Mr. G. ROSS, it was resolved that the proceedings be printed and circulated amongst the shareholders.

On the motion of Mr. BEAUMONT, seconded by Mr. BEDFORD, a vote of thanks was passed to the Chairman and directors, and the meeting broke up.

## WEST WYE VALLEY LEAD MINING COMPANY.

An extraordinary general meeting of shareholders was held at the offices of the company, Change-alley, on Tuesday to take into consideration the financial position of the company.

Mr. ROSS in the chair.

The CHAIRMAN said he regretted to see such a small attendance to-day. The directors had prepared what they fancied was information of the fullest possible kind, which fully justified them in recommending the course which it was proposed to pursue. Some of the gentlemen present would remember that so far back as the report of the directors for 1878 the directors pointed out that the capital was running short from a variety of causes which were explained at the time, and it was also stated that it would be necessary before long that the share capital should be supplemented by an increase on certain loans or debentures. The dull times of the commercial world were about that time at their dullest, and there was no disposition shown by the shareholders to come forward and accept the recommendation of the board. Upon application to Mr. Kitto as to the proper course to recommend he recommended that they should persevere and obtain further capital, and he backed his recommendation by very good reasons. The directors rendered themselves personally liable for a loan of several hundred pounds to carry on the mine, and still followed up their endeavours to raise a certain loan on debentures, and after a vast amount of correspondence and printing they succeeded in raising the full amount of 3000*l*. He would take them back to the report of Oct. 31, 1879, when they had raised the full amount of 300 debentures of 10*l*. each, and in those accounts there was 1080*l*. still to be called up. But they must remember that at the time these debentures were raised the mine was in debt to the extent of 1000*l*., which had been borrowed upon the personal security of the directors, so they had not really had the full benefit of the 3000*l*. of debentures. In the statement of assets and liabilities appended to the report there was a portion of the loan unpaid of 400*l*., which was still running, and the present accounts had been taken up from that period, and presented in the form in which they were now laid before the shareholders. Those accounts showed a diminished expenditure upon the mine in every way. He was happy to say that the report of Mr. Kitto, which accompanied the statement of accounts, was of the most satisfactory and encouraging nature. There was one thing which very much threw the directors out in their calculations—the low price of lead. During the last two years they had sold 310 or 320 tons of lead ore at fully 50 per cent. less value than they were led to expect at the time the mine was started; this would represent the best part of 2000*l*. which they now ran short in. From what Mr. Kitto now said there was scarcely any doubt that a little more money added to the 2000*l*. which they had thus run short of would do everything which was wanted to bring this company into the same satisfactory position which the adjoining mine was in at the present time. The directors had not come before the shareholders without thoroughly considering the future and what was best to do under the circumstances, and he might as well mention here that it was proposed to continue the working of the mine as a going property. It was proposed to raise a sum of money which it was thought would do more than Capt. Kitto had told the directors ought to be done, but it was further in contemplation to give certain inducements to those who came forward and subscribed the money. The directors recommended the shareholders to adopt the course proposed to-day in preference to creating a further amount of debentures, because in the first instance a debenture debt saddled the company with a large amount of preferential interest, and in the next place he did not think the shareholders would give them the necessary support, although they would probably give a large amount of support. Whatever was done for the good of the company in future should be done by everybody, and he believed that by means of the resolution set forth in the notice from the ashes of the old company would arise a much stronger one, and one possessing much better prospects than the present company did when it was started, although those prospects were good enough to satisfy any moderate miner. He believed Mr. Kitto would tell them they were within a short distance of touching the prosperity they desired. He would read the extract from the report of Capt. Kitto of Nov. 17, 1879, which would be of interest to the shareholders:—

"Brookes' shaft has been sunk to the 64 fm. level, lodge cut and lift of pumps fixed, and before the end of the current week we shall be fairly underway sinking for another level 12 fms. deeper. The 64 fm. level has been driven east of this shaft 23 fms. 1 ft. and west 11 fms. 5 ft. In the former drivage the lode so far has been rather too soft in its character to produce ore in paying quantities, but we have only a few fathoms more to drive in this direction to reach a run of orey ground that we passed through in driving the 52 fm. level, and upon which a winze has been sunk for 6 fms. below the 52, with very satisfactory results. This sinking, however, has had to be suspended for the present, on account of a large increase of water, but as soon as this is drained to the 52 fms. it will be again resumed. The same level has been driven west of shaft through a very fine looking lode, which has yielded ore, more or less, for the whole distance, and at present is producing very good saving lead stuff, with every prospect of still further continued improvement. The lode at this point is firmer in character and more likely to become permanently productive than anything we have before seen in the mine, and I have no doubt that the next deeper level will show greatly improved prospects. All through the mine, from one end to the other, and even down to the bottom or 64 fm. level, the lode has been strongly impregnated with copper, which shows very plainly that greater depth is required, and when we get into permanently settled ground the copper will give place to lead, and we shall undoubtedly find the lode profitably productive. I would, therefore, strongly urge the necessity of continuing the sinking of Brookes' Shaft with all possible speed, as I am as fully convinced now as I ever was that we have a very valuable property, which only requires to be more fully developed to become a source of great profit to the shareholders."

This extract formed a prelude to Capt. Kitto's report of to-day, which was as follows:—

"In presenting you with our report for the meeting of the shareholders to be held on Tuesday next, we are sorry not to be able to lay before you a more satisfactory account of our past operations. We have done, as may be seen from the plans which will be laid on the table at the meeting, a considerable amount of development works both in sinking shafts and driving levels, and in so doing have discovered some good bunches of ore, but these have not proved continuous in going down, but appear to be mere surface deposits, showing by their decided character and purity of composition that they are sure indications of larger bodies of similar ores being close at hand, but which will, without doubt, be found in a deeper and more settled formation as the ground hitherto has been of a soft nature, and in many parts of the mine, particularly in the upper section, uncon-

genial for the production of lead and blende ores. The rock in the 64 fm. level, however, is of a much firmer description, and judging from the improved character of the lode in Brookes' shaft, sinking below the 64 fm. level, we are decidedly of opinion that we are in close proximity to large and continuous courses of ore, and we strongly recommend the further sinking of the shaft above referred to, and the proving of the lode at a deeper level, as we believe that by so doing we can scarcely fail to realise that success which, from present prospects, we have every reason to anticipate. The 84 has been driven east of Brookes' shaft about 26 fms. and the same distance west. In the former we have only about 5 fms. further to drive to reach a run of orey ground discovered in the 52, and in the latter we are only a few fathoms from another run of ore passed through in driving the 40. These are two very important and interesting points, and we have little or no doubt that by following them down they will lead us on to more successful and satisfactory results, and we are anxious to resume the sinking of the shaft with as little delay as possible, so as to come underneath the runs of orey ground above referred to, and where we fully believe the lode will be found profitably productive. The mine throughout, both underground and at surface, together with the machinery for pumping, drawing, and dressing is in an excellent state of repair, but in order to carry it on successfully, and to continue the sinking of Brookes' shaft for deeper levels without interruption, it will be necessary to erect another wheel for pumping, as in dry and frosty weather we are often short of surface water, and the sinking is sometimes delayed in consequence. The wheel we now have has to do the pumping and drawing from Brookes' shaft below the 40, as well as having a saw-mill attached, and without a full supply of water it is unequal to the work. We may say, in conclusion, that the lode, which varies from 40 to 60 ft. in width, has not been proved in any of the levels, as it should have been by cross-cuts having been put through from one side to the other at various points, but this has been omitted from want of funds, and not from any doubt of such operations proving successful; and we may add that if a comparatively small amount of additional capital is subscribed towards the further development we are fully confident of being able to show a very satisfactory result, and at no very distant period."

He thought the report fully justified the directors in the steps they were taking to introduce more money, and he was perfectly assured that if the proprietors did not see their way to subscribe whatever capital might be necessary there were others ready to step into their shoes and find the money required. He was sure that if any further details were required Captain Kitto would be most happy to give them.

Capt. KITTO said he was sorry to ask the shareholders for more money to carry on the operations of the mine in such a time of depression as the present, but he was satisfied the prospects of the mine fully justified the course which had been adopted. There was no doubt whatever that the lode was there, but from want of time and funds they had not yet been able to prove the lode, and in some cases it had not even been proved in the levels which had been opened.

Mr. DAVEY asked how much money would prove the mine?——Capt. KITTO said he thought that 6000*l.* would amply prove it. He looked upon the West Wye as the counterpart of the New Wye Valley, but in the West Wye they would have to go deeper to prove the lode. He believed the amount he had mentioned, or perhaps 4000*l.* or 5000*l.*, would amply prove the mine, so that the shareholders would be able to see whether it was a good mine or worthless.

A discussion ensued, chiefly on matters of detail, and of no public importance, in the course of which the Chairman reiterated the opinion of Capt. Kitto that the amount now asked for would be more than ample to prove the mine.

The CHAIRMAN said the time for the reconstruction of the company would not exceed three months, and he believed the cost, independent of the legal expenses, would not exceed 70*l.* It was not necessary to have a new lease, but simply to execute a new declaration of trust. He might mention that the lords had acted liberally to the company, and had made a reduction in the royalty when the price of lead was below 10*l.* per ton. He moved the following resolution:—

"That the leasehold interest, with the plant, machinery, and other effects of the company be transferred to a new limited company, with a nominal capital of 40,000*l.*, in consideration of the said new company undertaking all the debts and liabilities of this company, including costs of liquidation, allotting to the holders of debentures shares fully paid (representing 15*l.* for every 10*l.* debenture) in full of all claims for principal and interest, such shares to be guaranteed a preference dividend of 5*l.* per cent. per annum out of the profits of each year, and to participare in any further profits which may remain for division after payment of a like dividend on the ordinary shares, such preference to cease when a dividend of 5*l.* per cent. per annum shall have been paid upon the ordinary shares for two consecutive years, and the allotment of three 1*l.* fully-paid shares in the new company for every two 3*l.* shares forming the capital of this company."

Mr. KERLEY seconded the resolution, which was put to the meeting and carried unanimously.

The following resolutions were also passed:—"That the company be wound up voluntarily."——"That Henry Robson Moore, the present secretary of the company, be appointed liquidator, at the salary hitherto paid him."——"That the liquidator be authorised to continue operations pending the transfer to the new company."

A vote of thanks was passed to the Chairman for his clear and lucid explanation, and the meeting broke up.

## ARENDAL MINING AND SMELTING COMPANY.

An extraordinary general meeting of shareholders was held at the offices, Austinfriars, on Wednesday.

The Rev. DIXON BROWN was, after some discussion, voted to the chair.

The SECRETARY read the notice convening the meeting.

A SHAREHOLDER called attention to the fact that reporters were present, and the Chairman asked if it was the wish of the meeting that the reporters should or should not remain?

Mr. PETER WATSON said it was a public meeting, and if the reporters were not allowed to remain he would retire also, for he would be no party to "hole and corner" proceedings in any sense. (Cheers.) They were there to discuss business, and he trusted that there would be no angry discussion or obstruction. He trusted that it would not go forward that the reporters were excluded from their meetings. (Hear, hear.)

The CHAIRMAN then put the question, and it was decided by a large majority that the reporters should remain. He then called on one of the requisionists to move the first resolution.

Mr. E. LEADBITTER, in moving a resolution to the effect that the registered offices of the company be removed to Newcastle-on-Tyne, said the feeling had been strongly expressed to him that, having regard to the great interest held in the company in the North of England, it would be in every way to the advantage of the company that the offices should be removed to the metropolis of the North. Of course there was a good deal to be said on both sides, but for the purpose of promoting a discussion on the matter he moved the resolution of which notice had been given.——Mr. DAVID BROWN seconded the proposition.

Mr. S. YORK then referred at some length to the past proceedings of the company.

Various points in connection with the details of the general management of the company in Norway were then discussed between Capt. Daw, Mr. Benson, Mr. P. Watson, Mr. Heritage, Mr. Stenson, and Mr. Hales.

Colonel JOICEY, M.P., said Mr. Watson, Mr. Leadbitter, and himself had just had a little conversation in an adjoining room, and they had been considering what would be best for the interests of the company. He was very glad to hear such a favourable account of the mine, and he thought the difference might be made up by a little alteration in the Articles of Association, and by increasing the number of directors from five to seven. There were now only four directors, but he thought the alteration which had been suggested would remove the difficulties (Applause.) That would be far better than going on with recriminations which could do no good, but a great deal of harm, and he trusted that the directors would take steps to carry the suggestion into effect. He was very pleased to add that Mr. Peter Watson had very kindly volunteered to render any assistance that he could to make the company a success—(applause)—and no doubt if the course recommended were adopted all the difficulties would vanish.

Mr. LEADBITTER, as the mover of the resolution, cordially supported the view expressed by Colonel Joicey. Mr. Watson had thrown oil on the troubled waters, and had offered to qualify himself for a seat at the board if it should be the wish of the shareholders that he should occupy that position. He thought, under the circumstances, it was highly desirable that they should have a man of such practical knowledge, and a man who stood high in the opinion of all connected with mining, as Mr. Watson. (Applause.) He thought instructions should be given to the secretary to call a special meeting for the purpose of taking into consideration the amendment of the Articles of Association with the view of increasing the number of directors from five to seven, and also with regard to the management of the company. It was very desirable that the whole matter should be settled in a friendly way, and that all should do their best to bring the mine into a dividend-paying state.

Mr. YORK had great satisfaction in supporting the suggestion made, and in endorsing what had been said as to the desirability of offering Mr. Watson a seat at the board. (Applause.)

Mr. STENSON also cordially supported the suggestion, and said it would add materially to the welfare of the company to have a man of Mr. Watson's large experience and probity to direct their affairs. (Hear, hear.)

Mr. PETER WATSON said he was taken so much by surprise that it was really difficult to know what to say on the subject. He came there simply as an independent shareholder, and he was very glad to have been able (as Mr. Leadbitter had said) to pour oil on the troubled waters. He had never seen or spoken to Colonel Joicey and Mr. Leadbitter until that afternoon; but he thought it was better for all concerned that, if possible, the matter in dispute should be settled amicably. He had too large an interest in other companies of which he was Chairman, and in the Great Laxey Company, of which he was a director to desire any additional duties; but when he took a thing up he would stick to it. (Hear, hear.) He certainly thought it would be wise to withdraw the resolution, and to call a meeting to increase the number of the board to seven. The directors should then consider the advisability of appointing a manager at the mine in whom they would feel confident. (Hear, hear.) That was a matter of great practical importance. With all due respect to Mr. Benson (whom he had never met before), although he might be imbued, with every good wish to do his utmost in connection with this mine, he thought it very unwise to interfere in the underground management of a mine, that should be left to the responsible manager. Mr. Benson with the best intentions of saving money had stopped the sinking of the winze; and Capt. Daw, on the other hand, said that rather than be dictated to he would give up his position, and this had probably led to the present unhappy state of things. He was quite satisfied that these differences were antagonistic to the interests of the company. (Hear, hear.) He had had knowledge of Capt. Daw for many years—long before he went to Norway—and knew him to be a practical man, and he thought he might be induced to undertake the superintendence of the operations, and to visit the mine once a month for the settings, having his son, or some one or other, there for a responsible resident agent. Capt. Daw had told him that if he had the management of the mine in his own hands he would bring it into a good dividend-paying condition very quickly, for the ore was there and only wanted developing. It might also be desirable to send out an independent man to inspect the mine. (Hear, hear.) As to his joining the direction, he had already quite enough to attend to, but if he was asked to go on for a time only he would be happy to render any assistance he could. If, however, the shareholders did not wish him to be elected he would be quite prepared to meet the directors at any time, and to assist them all he possibly could to get a perfectly independent man to visit the property. They were all interested in the success of the company, and all desired that there should be an end of quarrelling, and that they should receive dividends on their capital. He hoped (to use a good old English expression) they would let bygones be bygones, and that they should all do their best to bring about what all desired. (Cheers.)

Mr. YORK endorsed what Mr. Watson said, and for his part was willing to let bygones be bygones, and to withdraw any charge that he had made.

It was agreed that all the questions in dispute should be withdrawn, and Mr. Leadbitter thereupon withdrew the resolution which he had moved, and in its place,

Col. JOICEY, M.P., proposed—"That the directors be requested to take the necessary steps to increase the number of directors to seven."

Mr. LEADBITTER seconded the proposition, which was carried unanimously.

On the motion of Mr. YORK, seconded by Mr. WATSON, a vote of thanks was passed to the Rev. Dixon Brown for his kind and impartial conduct in the chair.

The meeting was then brought to a close.

## NORTH PENSTRUTHAL MINING COMPANY.

The four-monthly meeting of shareholders was held at the offices of the company, Draper's Gardens, on Wednesday,

Mr. PETRIE in the chair.

Mr. ASHMEAD (the secretary) read the notice calling the meeting. He also read the following report from the agents:—

*June* 12.—Highburrow Shaft: Since the last general meeting we have sunk this shaft to the 108, where the lode is 3½ ft. wide, producing occasional stones of copper and a little tin, but not yet sufficiently out of the influence of the elvan course to become permanently settled and productive. However, from present appearances we are of opinion that in the course of another 10 fathoms sinking mineral in paying quantities will be found. In the 108, driving east of the shaft, the lode is 3 ft. wide, producing a little mineral of both copper and tin; the same remark will also apply to the 108, driving west. The lode in the 88, driving west of shaft, is 5 ft. wide, and worth for tin 8*l.* per fathom. This level has in the last 2 or 3 ft. driving considerably improved, and from appearances we expect further improvement. The lode in the 46, driving east of shaft, is 2 ft. wide, and worth for tin 9*l.* per fathom. We have driven the 58 cross-cut about 24 fms. north of Highburrow lode, in which we have met with several branches highly mineralised, and we expect in 6 or 7 fms. driving to cut the Chy lode. The 46 fm. level cross-cut is extended south 73 fathoms; the driving of this level has been for some time suspended, in consequence of imperfect ventilation. The driving will be resumed by boring machinery in the course of a few weeks, all necessary preparations are being hastened on.—Ward's Lode: In the 10, driving west on cross-cut, we have an improvement; the lode is now 4 ft. wide, and worth for tin 8*l.* per fathom. Above this in the bottom of the adit level a winze is sunk about 3 fathoms. We purpose resuming the sinking of this next month, and when holed a good piece of stoping ground will be laid open. The new skip-road is complete to the 108 with all appendages, also the skip and whim-engine are working admirably. We are pleased to say our prospects are better than for some time past.—S. DAVEY, W. POLKINGHORNE.

The CHAIRMAN said: Gentlemen, the report just read shows that since we last met a considerable amount of work has been done. A new account-house, carpenters' and smiths' shops, have been begun, and almost completed, as well as a new whim engine-house and the erection of engine and boiler, with connections to the Highburrow shaft, all these being portions of the needful preparations for the vigorous and economical working of the mine. We have yet to supply, in the way of machinery, an air-compressor, which I may say is now on the mine, and some 500 or 600 yards of pipes, and boring machines, which we hope to have at work in five or six weeks. Having visited the mine at the latter end of April, and early in May, I can speak from personal observation of the substantial and satisfactory character of the work generally. When we met in February last I rather expected the 46 cross-cut would by this time have been driven to the 40 ft. lode, but this has not yet been done for the reasons stated in Capt. Davey's report. With respect to financial matters, the statement of accounts will have made it clear that during the four months ended April 24 last 1511*l.* 5s. 10d. has been expended over and above the amount realised by the sales of tin. Of this amount the sum of 644*l.* 12s. 2d. has been paid for new buildings and machinery, leaving 870*l.* 18s. 8d. as the actual expenditure for the working of the mine in excess of the receipts, being an average of nearly 213*l.* per month of four weeks. I have now to move that the report which has been read, together with the statement of accounts, be passed and adopted, and printed and circulated amongst the shareholders.

Mr. WADDINGTON seconded the resolution.

The CHAIRMAN said he might mention that he should afterwards have to propose that a call of 10s. per share be made, which, on 6000 shares, would bring in 3000*l.* At present they were about 1200*l.* out of pocket. They wanted from 300*l.* to 400*l.* to put the machinery properly to work, and there were other small matters which would bring it up to 1600*l.* If during the next four months the cost should exceed the income by 220*l.* per month, that was nearly another 900*l.*, so that altogether 2500*l.* would be required in the next four months.

Mr. WADDINGTON said that the expenditure of 3000*l.* would to a great extent prove the ground, and then he believed they would get something very good, which would more than enable them to pay their way. They were close upon cutting the 40 ft. lode, and the indications there were very good. In the cross-cut at the 46 there were several branches, but they had not advanced sufficiently there to open upon the branches at present. Having referred to one or two other points in the mine he went on to say that he hoped they would obtain good results from the boring machinery which they were now getting to work. The shaft was now down to the 108, and if the cross-cut at the 58 should cut a good lode they would have a great and profitable mine that would cost very little money. He hoped that by the next meeting they would see the 40 ft. lode—in fact, he thought it very probable they would see it in two months.

The SECRETARY, in reply to a question, said the whole of the last call had been paid.——Capt. DAVEY said he had very great confidence in the future success of the mine.

In the course of a desultory conversation a feeling was expressed that it was not advisable to sell the tin for at present low prices.——The resolution was then put and carried.

On the motion of the CHAIRMAN, seconded by Mr. LETHBRIDGE, a call of 10s. per share was then made, payable forthwith.

The meeting then broke up.

## SOUTH PENSTRUTHAL MINING COMPANY.

The four-monthly meeting of shareholders was held at the offices of the company, Draper's Gardens, on Wednesday,

Mr. WALTON in the chair.

Mr. ASHMEAD (the secretary) read the notice calling the meeting, and also the following report from the agent:—

*June* 12.—Engine and Engine-house: During the quarter we have completed the building of the 60-in. engine-house, taken out and removed the engine from North Pool to this mine, and commenced putting it in; the bob is fixed, and other work connected therewith steadily progressing; this will be pushed on to completion as fast as possible.—Engine-shaft: This shaft is being enlarged from 9 ft. by 5 ft. to 12 ft. by 7 ft., and is cut down 22 fms. from surface, securely timbered (or collared), and cased and divided to the point above mentioned, and completed for the reception of the pitwork.—Adit Level: This level has been cleared about 600 fms. from the tail (or outlet), but not as yet permanently secured in consequence of a large stream of water going down into the mine yet in advance to the west, which we shall try, if possible, to clear, and pass the water through the adit previous to commencing to pump or fork the mine, when permanent repairs will be attended to.—Surface Operations: We have cleaned out and enlarged two extensive reservoirs for the reception of rain water for condensing the engines, also lobby for draining boilers, &c., cleaned out foundation for boiler-house and bob-stand, and have commenced to open cutting for flat-rods. The above, with other preparatory work, is progressing satisfactorily.—S. DAVEY.

The CHAIRMAN said that since the statement of accounts was made out they had spent the 405*l.* they had in hand by paying the May cost-sheet, and they would, therefore, require money. Since the accounts were made up 65*l.* out of the 90*l.* of arrears of calls had been paid up. He moved the adoption of the agents' report and statement of accounts.——Mr. WADDINGTON seconded the resolution.

Capt. DAVEY, in reply to Mr. ORLANDO WEBB, stated that he calculated upon having the engine at work within six weeks from the present date.

Mr. WADDINGTON said the company had one of the best engines in the county, and also a good whim. He confirmed Capt. Davey's view that in six weeks or two months they would be actually at work.——The resolution was then put and carried.

The CHAIRMAN then moved that a call of 5s. per share be made payable at Messrs. Glyn, Mills, and Co. forthwith, which on the 6000 shares would produce 1500*l.*——Mr. LABY seconded the resolution.

Mr. WADDINGTON, in reply to a question, stated he calculated that, on the whole, it would take about 6000*l.* to put the mine in thoroughly good working order. It was the opinion of everybody in the district that the company had the prospect of the richest copper mine in the district. There was a great body of mundic ore which had never yet been gone through, and the general opinion was that under the sulphurous mundic there was a great deposit of yellow ore, and it was this for which the company were aiming at.

The resolution was put and carried, and the meeting broke up.

EAST POOL.—At the quarterly meeting at the mine, on Monday (Mr. G. A. Mitchell in the chair), it was stated that although they had received an average of 10*l.* 7s. 2d. per ton less for their tin (which made 3000*l.* difference in their receipts), their profit on the 12 weeks' working was 6600*l.* 8s., giving, with the balance brought forward, 6809*l.* 14s. to dispose of. A dividend of 6400*l.* (1*l.* per share) was declared, and 409*l.* 14s. carried to credit of next account.—Capts. J. Maynard and Charles Bishop reported upon the various points of operation. In the engine-shaft at the 200 the cross-cut north was driven 13 fms., and they hope in another month to cut the great lode. Mr. Martyn stated that during the last 12 weeks they sent to the stamps 256 tons 11 cwts. 26 lbs. of tin, according to assay. They sold 260 tons 8 cwts. 1 qr., and increased the working stock on the floors to an extent that left a surplus of 8 tons 15 cwts. 2 qrs. 1 lb. of tin. In order to estimate the value of this they must throw their minds back to what they had formerly done in regard to the returning of their tin, and he would tell them that for some time their loss was from 14 to 14½ per cent. Now, they had actually dressed more tin than had been sent to the stamps.—The Chairman said that if they had had the average price of the previous three months they would have been able to give a dividend of 30s. per share. At the last meeting they had hoped to have done better, and so they would have had had not the times been against them. They had a good mine, and one from which they could raise a large quantity of stuff, and the only thing that was required to enable them to continue their dividends was to get a good price for their metals.—Capt. Maynard (the manager) said he was fully persuaded the mine never looked better than at present.—Capt. Bishop also replied, and observed that the prospects of the mine were exceedingly good.

## FOREIGN MINING AND METALLURGY.

There is little disposition to concede lower terms in the Belgian iron trade. The great works are still well occupied, and will not give way an inch. They continue even to do business at the old rates of 5*l.* 12s. to 6*l.* per ton for iron, and 8*l.* per ton for No. 2 plates, with the usual scale per number. On the other hand, some works which are without employment would accept orders at very low rates. Some contracts have been concluded in this fashion; one is even stated to have been let for pig at 2*l.* 4s. per ton. An adjudication has just taken place in Belgium for two lots of axles for locomotives. Belgian firms were outbid on the occasion by German houses. The John Cockerill Company has secured an order for 1 7-8th mile of iron sleepers. A delivery of about equal importance on the Serres and Battig system is also to be made to Spain. M. Henry, director of the Rodange Blast Furnaces, is endeavouring to obtain a concession of about 50 acres of mineral lands from the Luxembourg Government.

A tolerably well-sustained current of small transactions has been noticed in the iron trade in the St. Dizier group. Following an example set them by the Nord, producers have reduced their quotations. Prices are not supported very definitely or fairly, but first-class coke-made iron has been dealt in at 8*l.* 16s. to 9*l.* 12s. per ton, while mixed iron has made 9*l.* 12s. to 10*l.* per ton, and iron from charcoal-made pig 10*l.* 8s. to 10*l.* 16s. per ton. In the case of small orders higher prices than these are sometimes paid. Sheets have been in more demand, and there has been some enquiry for iron wire. In the Ardennes ordinary iron from coke-made pig has been quoted 8*l.* 16s. to 9*l.* 4s. per ton. The Creusot Works are stated to have obtained a colossal order from the Western of France Railway Company—100,000 tons of steel rails, to be delivered in 10 lots of 10,000 tons each, between 1882 and 1892 inclusive. This statement, however, requires confirmation; it does not present much *prima facie* probability. In Austria the iron trade has remained in a very quiet state, and the situation does not appear likely to improve for some time to come. Almost all descriptions of metallurgical products are in little demand in Austria. Plates alone form an exception to this remark, more particularly steel plates. Prices of iron and steel have remained nominally unchanged upon the Austrian markets.

The Belgian coal trade has not experienced any very appreciable change. Matters have drifted into the condition in which they are generally found during the dead season. Colder weather has probably increased the domestic consumption of coal, but at this period of the year no very serious demand can be anticipated under this head. Industrial qualities of coal have remained in demand in Belgium, and prices have been 1s. 3d. to 1s. 8d. per ton higher than they were at this period of 1879. Some of the Belgian collieries have resumed work on Mondays, but these are the exception rather than the rule. Some official adjudications of coal contracts which are about to take place in Belgium will probably have the effect of fixing prices with more precision. The French coal trade presents a dead season aspect, but still prices are maintained with a tolerable amount of steadiness. The Burnhope Colliery, Newcastle-on-Tyne, has secured a contract for the supply of cokeing coal to the Western of France Railway Company. This contract comprises about 40,000 tons, to be delivered at Dieppe, and 3500 to be delivered at St. Malo and Honfleur. The contract price for the coal to be delivered at Dieppe is 13s. 9d. per ton. The corresponding price for the coal to be delivered at St. Malo and Honfleur is 15s. 9d. per ton.

The German Railroad Union, in offering prizes for the six years ending July 5, 1881, suggests the especial desirability of devising the following improvements. 1.—The invention of a locomotive tender or car wheel of simple but safe design, by which the loosening of tires will be effectively prevented. 2.—The invention of a simple apparatus, which can be depended upon under all circumstances, which will render it possible for train-men on different parts of a long train to communicate with the engine-man. 3.—The invention of a cheap but reliable signal apparatus for the automatic blocking of trains which follow each other closely upon the open road, for regulating and rendering safe the traffic on crowded sections of the road. 4.—The invention of apparatus which will make it possible for a train-man, with the ordinary form of brake, to apply the brakes simultaneously on two adjacent cars. This is required especially for freight cars.

The output of coal from the mines in Upper Silesia has been very considerably increased this year. The statistics for the first quarter show that the total output for that period was 2,635,000 tons, an increase of nearly half a million tons against the corresponding period last year. Notwithstanding increased trade, however, the average price obtained was lower than that of any year since 1868, excepting last year, against which it shows an improvement of about 5 per cent.

## SHORT NOTICES ON IRISH MINES.

BY WILLIAM THOMAS.

In the extreme south-west of the county of Cork there are four bold headlands facing and penetrating the Atlantic Ocean. The Brow-head is the most southerly; next, the 'Mizen Head; then Three Castles Head and Sheeps Head; and the most northerly is the Dursey Head. These headlands are parallel, and run in a westerly direction into the Atlantic, and form Dunmanus Bay and Bantry Bay. While the Dursey Head divides Bantry Bay from the Kenmare river, at the head of which, and about 40 miles from the Dursey Head, is situated the town of Kenmare. The range of mountains running east inland from Dursey Head are from 1200 to 2500 ft. high above the sea level, and with the exception of the celebrated Berehaven Mines, which are situate at the north side, this great mountain district extending between 40 and 50 miles in length inland is unknown and unexplored. At Glenmore, south of Dereen, great lodes of quartz and yellow copper ore occur in the Caha Mountain, and great advantages exist for carrying out extensive mining operations by adit levels. The back of the lode at Berehaven Mine consists of a great mass of quartz. Some would pronounce it unfavourable for the production of large quantities of mineral; underneath, however, was found one of the best copper lodes in the United Kingdom, having yielded millions worth of copper ore. And as great lodes of quartz crop out in some parts of these mountains, a careful exploration may probably lead to the discovery of another Berehaven. Near the Waterfall, at the south side of the mountain—the property of Lord Charles Pelham Clinton—there is a great lode of quartz mixed with yellow copper ore; and in the Glenmore—the north side, on the property of the Marquis of Lansdowne—there are great lodes of quartz and yellow ore. The splendid harbour of Castletown, Berehaven, is close to the Waterfall property. While Kilmackalogue, also a magnificent harbour, runs up to Dereen, the country residence of Lord Lansdowne. At the base of Glenmore, from the Kenmare river, proceeding eastward the Glannarought Mountains rise to a considerable height, and at the north side in the valley of Tuosist, near the south shore of Kenmare river, a few surface trials were made many years ago, and several lodes discovered containing gossan, quartz, blende, silver-lead ore, carbonate of copper, &c. Lodes containing copper ore skirt the south shore of Kenmare river, from Tuosist to Mucksua, near the suspension bridge Kenmare, where some years ago several tons of grey ore and carbonate of copper were quarried open from surface. Good specimens of copper ore were also found near Cromwell's Fort. The mountain ranges named in this paper consist of clay-slate. The Roughty Valley, immediately to the east of Kenmare, is from half to three-quarters of a mile wide, and consists of carboniferous limestone, which extends eastward about eight miles, when it wedges out in the clay-slate. It extends west of the town about three miles at the north side of the river, under which it disappears. Rich lodes of galena, blende, arsenical pyrites, and iron ore have been discovered in the limestone, and valuable copper lodes near the junction of limestone and clay-slate.

# Lectures on Practical Mining in Germany.

## CLAUSTHAL MINING SCHOOL NOTES*—No. CXLXV.

BY J. CLARK JEFFERSON, A.R.S.M., WH. SC.,
Mining Engineer, Wakefield.
(Formerly Student at the Royal Bergakademie, Clausthal.)

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In the last lecture we gave the most popular explanation of the theory that a reduction of the barometric pressure facilitates the issue of gas from the pores of the coal, and adduced some of the principal evidence given for this theory. The following are some of the considerations and the arguments usually advanced against this theory.

From observations on the average percentage of gas in the returns of a mine, the total amount of air passed through the returns daily, and the daily output, the relative proportion between the number of cubic feet of gas evolved in the mine for every ton raised can be ascertained, and with a considerable number of observations a fair average may be struck. If these observations are made in a colliery that has been at work for a considerable number of years the above average may be taken as one expressing pretty nearly the amount of gas originally contained in the coal if under a pressure of one atmosphere. From several similar and other observations it seems pretty certain that many coals contain in each cubic foot at least 100 to 200 cubic feet of gas at the ordinary barometric pressure; in other words, the volume of the gas inclosed in the pores of the coal when it escapes, and is under ordinary pressure, is 100 to 200 times that of the coal in which it is enclosed. To compress the gas back, therefore, into the volume of the coal in which it was contained would require a pressure of 100 to 200 atmospheres, or 1470 lbs. to 2940 lbs. to the square inch. Since, however, a very large portion of the space is filled by the solid carbon of the coal the gas really exists in the pores of the coal under this pressure. The densest form in which carbon is known to exist is as the diamond; and it is very probable that as such it is impervious to gases under the greatest pressures. The density, or specific gravity, of coal may be said to average 1·3, and the specific gravity of the diamond is 3·4, or the density of carbon in its densest form is 34-13ths, or 2 8-13 times as great as the density of coal. Hence if the carbon in a cubic foot of coal could be compressed to the density of the diamond it would occupy only 13-34th of a cubic foot, and the volume of the space of the pores in a cubic foot of coal would be 21-34 of 1 ft. We have just mentioned that to compress the gas which escapes from a given volume of coal back into the volume of the coal would require a pressure of 100 to 200 atmospheres; to compress it back into the space of the pores, however, would require this pressure increasing in the proportion of 34·21, or nearly 2-3ds as much again; so that instead of the numbers above we should have 160 to 320 atmospheres as the pressure required to compress the gas which escapes from the coal back into its pores.

Since the moving force, on which depends the exit of the gas from the pores of the coal, is the difference between the original pressure of the gas in the coal and the atmospheric pressure, it is urged that a sinking of even 1 in. of the barometric pressure alters in a slight degree the ratio between the original and the atmospheric pressure. Take, for example, the supposition that the gas is enclosed in the coal under a pressure of 100 atmospheres, and that the barometric pressure is 30 ins. If we express the pressure of the gas in the coal in inches we have 3000, and the propelling force, or difference, is 2970 ins. Suppose the barometric pressure to lower to 29 in., the propelling force or difference is 2971 in. The ratio of the projecting force in the two cases is, therefore, as 2970 to 2971, or the propelling force is only increased by 1-2970th. It is argued that this increase is comparatively so small that if the amount of gas evolved is in like proportion to the propelling force, the variations of the barometer are of little influence on the exit of the gas. The actual velocity of efflux of gas is, however, dependant on the difference between the original pressure and the sum of the atmospheric pressure, plus the pressure representing the resistances (frictional and otherwise) offered to the gas in passing along the pores of the coal. These resistances, however, very nearly balance the difference between the original and atmospheric pressure. The resistances being so great, the velocity of exit is correspondingly greatly reduced. The resistance offered to the passage of the gas through the pores of the coal cannot be considered merely or in great part as frictional resistances; and, consequently, the general laws of the flow of gases through long tubes cannot be taken in considering the flow of gas in the pores of the coal. The course of the gaseous particles through the pores of the coal will be anything but straight, and may be considered as being constantly interrupted, and caused repeatedly to take a course at right angles to its general direction. Again, the gaseous particles will be constantly passing through passages (the pores) of very varying section; and on this account also will meet with a resistance much greater than if passing through a straight space of uniform section. These resistances are so great that, compared with them, the barometric changes may be said to be comparitively insignificant in increasing or decreasing the velocity of flux. Again, it is said that a pressure of 1 in. of the mercury column, or ½ lb. to the square inch, cannot be considered sufficient to cause a flow of gas through any great thickness of coal, and that on this account the influence of the barometric pressure does not penetrate to any great distance into the coal. Moreover, the depth of coal worked away daily from the face must be considered as lessening the distance (and, therefore, the resistance) from the face to the depth at which the gas is at its original pressure, in a much greater degree than resistance is lessened by a reduction of the barometric pressure, and that the more rapid working away of the coal is in many cases the cause of a greater inpour of gas. In support of this view it is pointed out that in the majority of cases the appearance of an extra amount of gas can be connected with a sway of the roof, which breaks and fissures the coal to a distance of several yards beyond the face.

It seems probable that the phenomon of diffusion through porous diaphrams is that which has most similarity with the efflux of gas out of the pores of the coal. From this point of view the physical properties of marsh gas become of vital importance in considering the velocity, and consequently the amount, of the gases issuing from the pores of the coal. The best researches on the phenomena of diffusion were made by Graham. His experiments, however, had reference to the diffusion of gases into one another, without any separating medium. He observed that the lighter the gas the more quickly did it diffuse into air, or other gases; and deduced from the results of his experiments the law that gases diffuse through or mix with one another inversely as the square root of their densities. Taking the velocity of diffusion of air as unity he found the velocity of diffusion for marsh gas to be 1·344, and for carbonic acid 0·812. These data, however, as they refer to the diffusion of gases into one another, without any intervening medium, are inapplicable to the case of the efflux of gas through the pores of the coal.

The researches of Bunsen have shown that Graham's law is not absolutely valid in the above simple form. Within certain limits he found the intensity of diffusion to be proportionate to the difference of pressure on the two sides of the diaphragm, and also to a coefficient of friction, depending on the nature and the thickness of the diaphragm.

Another circumstance must also be considered as making an important difference between the diffusion of gas through a porous diaphraghm, such as unglazed earthenware, marble, &c., and through coals—viz., that a large quantity of water often exists in the pores and this will very materially modify the rate of diffusion. It is not at all improbable that the carbonic acid exists in a liquid condition in the interior of the coal. It may be also that, owing to the minute size of the pores, the phenomena of capilarity and of the occlusion of gases must be added to complicate the consideration of the efflux of gas from the pores of the coal as affected by barometric changes. Objection is also taken to the attempt to trace all explosions to one cause, when other conditions necessary to bring about an explosion must be concurrent; and it is not logical to assume that these other conditions, which are not universally or constantly present, should concur exactly at the time of a low barometer. Nor can the fact that a fall of the barometer affects all mines alike, and consequently points out by explosion those places only where these concur, be accepted as conclusive without it be proved that a large output of gas really accompanies a low barometer in all, or nearly all, mines; and that consequently when an explosion is accompanied with a low barometer enquiry should be made in the other mines in the neighbourhood whether at the same time an extra quantity of gas has been met with. Hence the exhaustive and elaborite tables which have been prepared are considered by many to be worthless, inasmuch as they refer merely to those cases where explosions have taken place; and it is pointed out that if such observations are made the barometric readings should be compared, with a careful estimate of the percentage of gas in the returns.

Again, it is pointed out that the structure of the coal in a coal seam is anything but uniform; that many of them are crossed by so called slips, or backs, which when come across may drain the gas from some distance back into the coal; and that on this account the exit of gas from the coal is anything but regular and uniform. In conclusion, it is pointed out that there many other circumstances, such as a break or sway in the goaf, a blocking of the air current by the coming in of a bank face, the knocking down of a brattice sheet, or leaving open a trap door, which may cause an extra collection of gas, circumstances the evidence of which is in most cases completely destroyed by the explosion; that no observations have been made in proof, and that general experience by no means gives evidence of a greater inpour of the gas into the workings of mines (where an explosion has occured) when the barometer falls. And generally that of the 50 per cent. of explosions which have been accompanied by a sinking of the barometer, there is no proof or evidence that other possible and probable causes have not been concurrent.

### INSTRUMENTS AND MODES OF MEASURING THE VELOCITY OF THE AIR CURRENTS.

The simplest, and probably the oldest, mode of measuring the velocity of the air is that of walking along in the direction of the air currents at such a speed that the flame of an exposed lamp burns quite steadily. The time which is thus required for passing over a given measured distance is noted, and out of three or four such an average is taken. The time is noted with a watch having seconds hands. This method is not so easy or simple as might at first appear, especially if the level traversed is not very uniform in section, on account of the fact that the person carrying the light will diminish the sectional area for the current, and hence cause the currents to travel faster past him than the real velocity in all cases where he is not travelling at the exact speed of the air current. This method of measuring the velocity is very difficult, and may be impossible in the case of high speeds. This mode of measuring requires also that the portion of the level travelled through shall be uniform and regular in section.

The next simplest, and probably the next oldest, mode of measuring the velocity of the air current is that of igniting a small quantity of powder, and noting the time required for the smoke to traverse a fixed measured distance. This method has the disadvantage that the taking of the observation requires two separate observers at two different points, and the watches of both must be adjusted or compared. It is probable that all the velocities given by this method are somewhat under the mark, since the particles forming the smoke are heavier than the air, and they tend to fall behind, whilst the finer lighter particles are so thinly dissipated in the atmosphere that they become invisible, and it is difficult to tell where the smoke cloud really commences.

*Being Notes on a Course of Lectures on Mining, delivered by Herr Bergrath Von Groddeck, Director of the Royal Bergakademie, Clausthal, The Harz North Germany.

## THE COAL TRADE OF THE WORLD.

The annual review of the coal trade prepared by Mr. Frederick E. Saward, of the New York Coal Trade Journal, has now become a standard book of reference amongst both producers and consumers, and the seventh edition, that for 1880, just issued, will fully maintain the high reputation acquired by the previous issues; indeed, there is probably but one further improvement that could be suggested—the statement of all the quantities in some uniform manner, as in metric tons, for example, since the comparison of 20 cwt. tons, 2000 lb. tons, metric tons, and bushels of various weights, 76 lbs., 80 lbs., and so on, is very confusing, and deprives the work of its full value. This confusion is the more regretable as from the fact that by taking away the 20 cwt. ton as 1½ per cent. heavier, and the 2000 lb. ton as 10 per cent. lighter, the metric ton would pretty closely be approximated, and the numbers could be converted with great rapidity; and the change is the more desirable, considering that nearly all the more important European countries have already adopted it, and inasmuch as for the preparation of the very interesting tabular statement of the coal production of the world, from which the subjoined figures are taken, these calculations must have been actually made. The figures show the square miles of coal area in each country, and the number of tons of coal wrought.

| | Coal area. | Tons raised. |
|---|---|---|
| Great Britain | 11,900 | 132,607,866 |
| United States | 192,000 | 59,808,398 |
| Germany | 1,770 | 50,400,925 |
| France | 2,086 | 17,096,500 |
| Belgium | 510 | 14,899,173 |
| Austria | 1,800 | 14,500,000 |
| Russia | 30,000 | 1,709,262 |
| Spain | 3,501 | 765,000 |
| Nova Scotia | 18,000 | 788,000 |
| Australia | 24,840 | 1,575,926 |
| India | 2,004 | 4,000,000 |
| Japan | 5,000 | 600,000 |
| Vancouver's Island | 390 | 228,974 |
| Chili 50,000, Sweden 90,000, Italy 220,000, China 4,000,000 | | 4,360,000 |

The principal anthracite coal field in the United States—472 square miles area—is in Luzerne, Carbon, Schuylkill, Northumberland, and Columbia counties, Pennsylvania. Anthracite coal is found in other States and counties, but the quality is not regarded as equal to that of the Pennsylvania coals, by the best authorities, and the commercial success of these outside deposits has yet to be demonstrated. The business of the year was unprofitable, notwithstanding the immense production; in fact, the losses were due to the fact that the supply was always ahead of the demand. It is anticipated that during the current year the improved condition of the manufacturing industries of the country will reverse this position, and by increasing the demand for coal make the business profitable to all concerned. The waste in mining and marketing the anthracite coal has been referred to in previous editions, and Prof. P. W. Sheafer, a good authority, now estimates that if 20,000,000 tons be annually marketed, the amount wasted to produce this quantity is 30,000,000 tons. This percentage of waste is considered much too large by conservative men in the trade, but even their average percentum is something like 15,000,000 tons as the amount wasted. In other words, we market but little over one-half of the presumed average contents of the coal seams.

The percentages of the various sizes of anthracite coal are carefully given. One of the district mine inspectors states that he has known the Wharton seam to produce 75 per cent. of lump, but not without a sacrifice of the smaller sizes, and an inferior quality of lump was the result. The Wharton seam will average 50 per cent. of lump coal without closing the grate bars closer than 4 ins. The maximum yield of the Mammoth seam is about 45 per cent. of lump, and that of the Buck Mountain about 40 per cent. The buckwheat coal and a great deal of "chips" is consumed at the mines for steam purposes. The "chips" is a thin coal mixed with thin slate, which is not marketable, is obtained by a circular segment, consisting of slots instead of meshes, and is put on the screen next to the chesnut coal jackets. The sizes of the meshes adapted for the various kinds of coal are:—Buckwheat coal passes over ⅞th in. mesh, and falls through ¾th in. mesh. Pea coal passes over ⅞ in. mesh, and falls through ⅝ in. mesh. Chestnut coal passes over ⅝ in. mesh, and falls through 1¼th in. mesh Stove coal passes over 1¼th in. mesh, and falls through 1⅝ in. mesh. Egg coal passes over 1⅝ in. mesh, and falls through 2½ in. mesh; and broken coal passes over 2½ in. mesh, and falls through 3⅜ in. mesh. Steamboat coal falls through 4¾ in. mesh. The average lump coal from all the seams is but 24½ per cent., and there is 2½ per cent. of steamboat coal.

The Cumberland (George's Creek) coal field, located in Alleghany county, at the western extremity of the State of Maryland, supplies an important proportion of the semi-bituminous coal reaching the seaboard markets. The mines of the George's Creek coal fields are located near to or upon the line of the Cumberland and Pennsylvania branch road, extending through the region, say 1½ to 20 miles from Piedmont, and from 11 to 33 miles from Cumberland. The mines are with one exception (the Borden shaft) drift openings in the hillside; the coal being let down inclined planes, ranging from 300 to 2000 ft. in length, to the main railroad, which follows the descent of the stream towards Piedmont. Of the quality of the production of the mines in this district it is almost unnecessary to speak Its superior quality has stood the test for nearly 40 years. The seam of coal worked is known to be 14 ft. in thickness; its full extent is seldom taken out, however, from various causes.

The first bituminous coal district of Pennsylvania is the most important in the State in point of production of this quality of coal; shipping two-thirds of the total output of bituminous coal. It embraces the counties of Washington, Westmoreland, Fayette, Green, Somerset, Bedford, and nearly all of Alleghany. The tonnage would have been larger had the Ohio river been in navigable condition. It is recorded as an unusual fact that from May 1 to November 15 there was no rise sufficient to float coal below Pittsburgh. The coke business in this district is an enormous and constantly increasing industry. All the coke ovens were run to their full capacity in 1879, and there are close on 5000 ovens in operation in the district. The production this year it is expected will reach upwards of 3,000,000 tons. The Connellsville coking coal region, located in this district, is famous throughout the United States for the quality of the production. Its porosity and strength have given it such a reputation for a blast furnace fuel that every coaking coal elsewhere found endeavours to make a favourable comparison with the Connellsville. The Monongahela and Snow Shoe regions are referred to, and there are then sections on the Northern Pennsylvania semi-bituminous coal field, McKean county, Westmoreland region, Sonman region, the Broad Top semi-bituminous coal field, the Myersdale region, and the Clearfield region. The report of the Geological Survey gives the coal of this region an exceptional character for purity and freedom from sulphur. The coal is used for steam purposes under stationary, marine, or locomotive engines, for making iron and steel rails, for glassworks, in lime kilns, and many other purposes, being much liked wherever used; ignites freely, burns readily, and leaves a white ash. It is not easily friable, and bears transportation remarkably well. The analysis of Clearfield coal shows an average of about 70 per cent. carbon, and 22 per cent. volatile matter, leaving 8 per cent. water, sulphur, and ash.

The coal measures of West Virginia underlie nearly 16,000 square miles of territory, of which what are known as the Kanawha and New River Valleys, traversed by the Chesapeake and Ohio Railroad, hold 8000. Several varieties of coal occur, among which are cannel, splint, gas, and bituminous. Of the bituminous there are seams of different degrees of hardness or texture, from the friable coking coal, similar to the best Newcastle (England) coals, to the harder splint coals, with regular cleavage, similar to the Youghiogheny coals, so largely in demand in our western and southern cities; of so compact a nature that it can be used in the blast furnace in its raw state. The bituminous coals are excellent steam raising fuel, and have been used on steamers, railways, and under stationary engines with good results. The gas coal seam is productive of a most excellent quality of coal that has been used in both the eastern and western markets with most satisfactory results. The value and importance of the Kanawha district as a source of supply from which good caking coals can be obtained is beginning to be understood and appreciated by gas manufacturers. These coals have established a high reputation where they have been tested and used for the quantity, purity, and illuminating power of the gas which they produce. The business from this region is increasing, and the present year is expected to show a still further enlargement of the tonnage moved by the railway company passing through this territory.

The principal sources of coal supply at San Francisco, California, are from Mount Diablo, in the immediate vicinity; from Coos Bay, in Oregon; and Seattle, in Washington Territory; from Vancouver Island, from Australia and Great Britain, as also Cumberland and anthracite from the Atlantic Coast. Coal has also been received in small quantities from Chili, Sitka. Alaska, and Japan, while the domestic sources of supply are constantly on the increase. Of the foreign sources of supply Vancouver's grows, while the British and Australian are falling off the local supplies are increasing largely; the coals from the Atlantic Coast do not hold their own. The price of eastern coals is against their general use. The Vancouver coals are taking the place to a large extent of Liverpool West Hartley &c., for domestic uses. The coal used at Mobile is mainly from Alabama, and although not large as yet the quantity is said to be increasing. The Pennsylvania coal received was for the gasworks. By far the largest proportion of bituminous coal received at St. Louis, Missouri, is from the Belleville district, in St. Clair County, Illinois. The principal seam worked is 5 to 7 ft. in thickness, and is economically mined. Analysis of this coal shows—water, 6; volatile matter, 38·8; fixed carbon, 52·2; ash, 5. The Iron Mountain Railroad brings the semi-anthracite coal known as the Spadra from Arkansas to this city. There is an increasing business done in coal at Montreal, Canada. There was more anthracite sent in last year than in preceding years, notwithstanding the duty of 50 cents per ton, which was levied by the Dominion upon American and British coal last year for the first time in the history of the trade. The American duty of 75 cents has been imposed on provincial coal since August, 1872, and this action of the Dominion Government was intended as retaliatory, and to foster the consumption of the provincial coal in the Canadas. With regard to imports and exports it is mentioned that the tariff from 1824 to 1843 was 6 cents per bushel, or $1·68 per ton; from 1843 to 1846, $1·75 per ton; 1846, 30 per cent. *ad valorem*; 1847 to 1861, 24 per cent. *ad valorem*; 1862-63-64, $1·00 per ton; 1865, $1·10 per ton; 1866 to 1872, $1·25 per ton; since August, 1872, 75 cents per ton. During the period from June, 1854, to March, 1866, the Reciprocity Treaty was in force, and coal from the British possessions in North America was admitted into the United States duty free.

[*To be continued.*]

MINERAL RESOURCES OF IRELAND—BAUXITE.—Although the mineral wealth of Ireland is lamentably neglected, it is gratifying to find that where capital and enterprise are brought to bear, the results are alike advantageous to the district selected and profitable to the capitalists engaged. For some time past an extensive and lucrative trade in bauxite or hydrate of alumina by the Irish Hill Mining Company, and as the analyses of Mr. John Pattinson, of Newcastle-on Tyne, gives 54, 52, and 46 per cent. of alumina, and 1½, 4½, and 15 per cent. of iron, it is not surprising that a large sale has been secured. It is remarked that as to utility it is the cheapest, best, and most economical article yet discovered for the mannfacture of alum, sulphate of alumina, and alum cake, and must, therefore, it is anticipated supersede anything else yet extant. Although bauxite in quantity is only of recent discovery, yet several patents have already been adopted both in this country and abroad, and amongst others may be named Mr. Peter Spence, of Manchester, Messrs. Duncan and Newlands, Condy and Rosenthal, of London, and Chadwick and Kynaston, of the St. Helen's Chemical Company, St. Helen's, Lancashire, which firms have used large quantities of the company's bauxite, as well as other consumers on the Continent and in the United States of America. Mr. James Duncan, of London, was one of the earliest consumers of bauxite, having given special attention to and realised its superior merits, and it has been found well suited for making the sulphate of alumina required for the alum process, owing to its being (unlike china clay) easily soluble in sulphuric acid

without requiring any fuel. The mines produce large quantities of superior bauxite, and the company possesses unequalled and well-proved facilities for guaranteeing regular and reliable supplies, and for conducting this trade thoroughly. They are also most conveniently situated, on two railways, which run alongside the loading berths of both steam and sailing vessels at the ports of Larne and Belfast, thus enabling us to ship largely, regularly, quickly, and at the lowest cost.

## GEOLOGICAL SOCIETY OF LONDON.

JUNE 9—ROBERT ETHERIDGE, F.R.S. (President), in the chair.

John Burn Anstis Du Sautoy, C.E., Blenheim-road, Bedford Park, Chiswick; and Rev. J. Cowley Fowler, B.A., North Stainley Vicarage, Ripon, were elected Fellows; Prof. G. Dewalque, Liége, a Foreign Member, and Prof. Leo Lesquereux, Columbus, U.S., a Foreign Correspondent of the Society.——Bernard Barham Woodward, Stowe-road, Shepherd's Bush, was proposed as a Fellow of the Society.——Edwin Muir, M.Inst.C.E., Wellington-street, Higher Broughton, Manchester; Benjamin Sykes, C.E., Winckley-square, Preston; and John Thorburn, Ditton, near Widnes, will be balloted for as Fellows of the Society.——The following communications were read:—

1.—"On the Occurrence of Marine Shells of existing species at different heights above the present Level of the Sea," by Dr. J. Gwyn Jeffreys, LL.D., F.R.S, Treas. G.S.

2.—"On the Pre-Devonian Rocks of Bohemia," by J. E. Marr, B.A., F.G.S.

3.—"On the Pre-Cambrian Rocks of the North-Western and Central Highlands of Scotland," by Henry Hicks, M.D., F.G.S.

At the meeting on Wednesday the following communications will be read:—1. "Notes on new Erian (Devonian) Plants," by Principal J. W. Dawson, LL.D., F.R.S., F.G.S.—2. "On the Terminations of some Ammonites from the Inferior Oolite of Dorset and Somerset," by James Buckman, F.G.S.—3. "Geology of Central Wales," by Walter Keeping, M.A., F.G.S., with an Appendix by C. Lapworth, F.G.S.—4. "On the Zones of Marine Fossils in the Calciferous Sandstone Series of Fife," by J. W. Kirkby: communicated by Prof. T. Rupert Jones, F.R.S., F.G.S.—5. "Faröe Islands. Notes upon the Coal found at Suderöe, by A. H. Stokes, F.G.S.—6. "On some new Cretaceous Comatulæ," by P. Herbert Carpenter, M.A.: communicated by Prof. Duncan, M.B., F.R.S., F.G.S.—7. "On the Old Red Sandstone of the North of Ireland," by J. Nolan: communicated by Prof. E. Hull, F.R.S., F.G.S.—8. "On the Skull of an Ichthyosaurus from the Lias of Whitby, apparently indicating a new species (I. zetlandicus, Seeley), preserved in the Woodwardian Museum of the University of Cambridge, indicating a new species," by Prof. H. G. Seeley, F.R.S., F.G.S.—9. "Note on the Cranial characters of a large Teleosaur from the Whitby Lias, preserved in the Woodwardian Museum, indicating a new species," by Prof. H. G. Seeley, F.R.S., F.G.S.—10. "On the Discovery of the place where Palæolithic Implements were made at Crayford," by F. C. J. Spurrell, F.G.S.—11. "A Review of the Family Vincularidæ, recent and fossil, for the purpose of classification," by G. R. Vine: communicated by Prof. P. M. Duncan, M.B., F.R.S., F.G.S.—12. "The Glaciation of the Orkney Islands," by B. N. Peach, F.G.S., and John Horne, F.G.S.

## CHESTERFIELD AND DERBYSHIRE INSTITUTE OF ENGINEERS.

The annual meeting of the Chesterfield and Derbyshire Institute of Mining, Civil, and Mechanical Engineers was held on Thursday, at the Stephenson Memorial Hall, Chesterfield. Mr. J. P. Jackson, of Ashover, presided, and there was a tolerably large attendance of members. Two new members—Mr. Robert Edward Cresswell, mining engineer, of Derby, and Mr. Joseph Springthorpe, colliery manager, of Whittington Moor—were admitted to the Institute. Mr. W. F. Howard (secretary) read the annual report, which set forth that there were 289 members and students in the institute; cash receipts, 539*l.* 2s.; payments, 514*l.* 0s. 1d.; bank balance, 139*l.* 2s. 2d.; and invested fund, 430*l.* The roll of the institute showed a decrease of 45 members of all classes, as compared with the previous year. The decrease was attributed to the serious effect of the coal and iron trades upon the incomes of members dependent on those industries. Still the council regarded the falling off in members as only temporary, and had reason to believe that, with improved trade, many of the old members would rejoin. The Chairman moved the adoption of the report. Mr. Wm. Oliver seconded the motion, which was carried. Mr. J. W. Fearn moved the appointment of a committee to make arrangements for the annual excursion of the Institute early in August. It is proposed that the excursion, which will be made to the lead mines of Derbyshire, shall extend over two days.

The following officers were elected:—President, Lord Edward Cavendish. Vice-Presidents: Mr. C. Binns, of Clay Cross; Mr. A. Barnes, M.P., Mr. E. Bromley, Mr. Arthur Carrington, Mr. R. G. Coke, Mr. J. P. Jackson, Mr. F. Swanwick, and Mr. J. Stores Smith. Council: Messrs. T. D. Crowdace, G. W. Fearn, W. D. Holford, J. Humble, C. E. Jones, S. D. Wardell, W. Wilde, G. Hewitt, M. A. Mills, W. Oliver. Treasurer, Mr. E. Bromley. Secretary, Mr. W. F. Howard.—Several papers were then discussed by the members: one on "Brick Kilns," by Mr. J. A. Longden; another by M. R. F. Martin, on "The Valve Gears of Engines at the Paris Exhibition of 1878;" and a third on "Mine Timbering," by Mr. J. Jefferson. A paper on "Lead and Lead Mining in Derbyshire," by Mr. A. H. Stokes, mining inspector, was taken as read.

The annual dinner in connection with the Institute was held in the evening at the Angel Hotel, when about 50 members were present. Mr. J. Stores Smith occupied the chair, and seated at the centre table were the Mayor of Chesterfield (Mr. J. Brown); Mr. C. S. B. Bushby, Clerk of the Peace for Derbyshire; Mr. J. P. Jackson; Mr. Thomas Evans, Inspector of Mines for the district; the Rev. J. M. Mello, of Brampton; and the Rev. B. Allison.

INSPECTION OF A BORING MACHINE AT BENHAR.—The Mining Institute of Scotland, which from small beginnings, under the fostering care of Mr. Moore, Inspector of Mines, and an active band of officials, is now a power in mining matters in the country. By invitation of Messrs. Robert Addie and Sons on Saturday we visited Benhar Colliery, Shotts, to inspect Messrs. Beaumont and Bicknell's boring machine, which is at present driving a stone mine in one of the ironstone pits of the colliery. There were about 40 members present, who were met at the colliery office by Mr. Morton, general manager, and conducted down the pit into the mine where the machine at work. Mr. James Gray, certificated manager, also showing the visitors every assistance. The machinery for compressing the air was erected on the surface, the compressed air itself being conveyed down the pit into the face of the mine through wrought-iron pipes. A single drill was first applied to the rock, when the brief space of 5 minutes it was found that it had holed 4 ft. 9 in. Two of the drills were then set agoing, when in 7½ minutes the one holed 4 ft. 11 in., and the other in 9 minutes, 5 ft. 3 in. Various other trials were made, and all present seemed highly impressed with the effectiveness of the machine. The process followed in connection with the machine, after the holing, is to withdraw it a distance of 30 yards when the rock is blasted by dynamite. The machine has been at work since January, and the average progress made has been at the rate of 1 fathom a day. While in the mine the members had also an opportunity of inspecting the very complete underground haulage arrangements in connection with the pit consisting of an endless chain, an endless rope, and compressed-air apparatus for working the pump in the mine which is being driven, and which is 10 ft. wide by 6 ft. high, and to the dip. In the afternoon the visitors were entertained to lunch in the school-room at Harthill—Mr. Morton being Chairman, Messrs. Miller and Gray croupiers. After a substantial repast, Mr. J. T. Robson, assistant Inspector of Mines, proposed the health of the firm of Messrs. Robert Addie and Sons, to which Mr. Miller responded. Mr. Gray proposed the firm of Messrs. Beaumont and Bicknell; Mr. Bicknell replied, and stated that if his firm were successful in obtaining the contract for removing the rock at Garvel Point on the Clyde, they intended to invite the Institute to visit their works there, when they would explain to them their system of aqueous and other kinds of boring. Mr. Smart, coalmaster, Hamilton, gave "Messrs. Addie's Managers," and Mr. Morton having responded, the company adjourned to the large room in the school-house, where it was arranged that Mr. Bicknell should deliver a lecture on Boring Machines. The train arrangements interfering, he had to confine himself to a description of his own machine, which he said was invented four years ago, and had been in use in Cornwall, Wales, Germany, Belgium, Yorkshire, and now in Scotland. At the close, on the motion of Mr. Gilchrist, secretary of the Institute, he was awarded a hearty vote of thanks.—*Glasgow Herald.*

## FOX'S PATENT CORRUGATED BOILER FURNACE FLUE.

At the works of the Leeds Forge Company, Leeds, a series of tests to determine the ultimate resistance to collapse of welded iron and steel boiler furnace flues have been undertaken by the above-named firm, under the guidance and supervision of the Board of Trade and Lloyds' Registry, for the purpose of determining the necessary thickness of plate in the case of corrugated furnaces. On Saturday, the first of these tests was made. The furnace flue tested was a mild steel one, made on Fox's patent corrugated system. Its dimensions were—length, 8 ft. 1½ in., of which a length of 7 ft. 9 in. was accurately marked off for the purpose of measuring the elongation. The distance between the centres of the exterior corrugations was 6 ft. 0½ in., these being 13 in number, 6 in. pitch, and about 2 in. through and through. In its original shape this flue measured at the centre diameter, vertically, 2 ft. 9⅞ in.; horizontally, 2 ft. 9⅝ in. At the third corrugation from the east end the diameters were, vertically, 2 ft. 9 17-32 in.; horizontally, 2 ft. 9 1-16 in. At the third corrugation from the west end, vertically, 2 ft. 9 9-32 in.; horizontally, 2 ft. 9¼ in. The thickness of the plate was ⅜ in. The pressures were ascertained by two gauges, made by J. Dewrance for the Marine Department of the Board of Trade, and one Schaeffer and Budenburg hydraulic gauge. The deflection and elongation at different pressures were measured with sliding rods by Mr. Peter Sampson, engineer surveyor to the Board of Trade; Mr. William Parker, chief engineer surveyor to Lloyd's Registry, both of London; and Mr. Wilson Hartnell, on behalf of Engineering. The pressures were raised by increments of 50 lbs. per square inch to 550 lbs., when the pressure was withdrawn, and it was ascertained that the flue had returned to its original shape, there being no set whatever. At 250 lbs. pressure per square inch the flue had only elongated 7-64ths of an inch, at 550 only 13-64ths of an inch, and collapsed vertically, outwards, 0·055 in.; horizontally, inwards, 0·065 in., the ends being free to move, and not fixed as they would be in a boiler. The pressure was then raised to 600 lbs. per square inch, the measurements were taken, and the word given to proceed to 650 lbs. On pumping being resumed, the flue began to scale and change its shape, when the pressure fell steadily back to 400 lbs. per square inch. In its collapsed state the flue measured in the centre, vertically, 3 ft. 0 1-16 in.; horizontally, 2 ft. 7⅛ in., having thus become rather oval, the sides bulging in, and the top and bottom out. The pressure was then re-applied to ascertain the strength of the flue in its collapsed state, and a 350 lbs. pressure per square inch was applied, without further collapsing the flue. At an early date the test will be continued, plain mild steel flues being the object of the next test. At the moment of collapse the aggregate pressure on the corrugated flue was 2315 ton.

It will be seen that, assuming this flue to be as nearly perfect practically as possible, there is no reason to ever exceed a thickness of ⅜ths of an inch, or even 5-16ths, in the case of corrugated furnace flues of ordinary diameters, to work at ordinary pressures. Experience teaches us that any reduction in the thickness of the flues brings about increase of evaporative power and economy of fuel, and we hear that corrugated flues are certainly effecting both these. We may mention the case of the Union Steamship Company's ship Pretoria. This steamer has but four boilers, whereas two sister ships, the Germania and Manora, have each six boilers, but with plain furnaces, the Pretoria's being corrugated. All three have engines exactly alike, and, in fact, are alike in all other particulars but the boilers. Ever since they were launched the Pretoria has exceeded her sister ships in speed and economy of fuel, besides having a greater carrying power by reason of the saving of the space occupied in the other steamers by the extra two boilers. In comparing the performances of the Pretoria with those of the Manora, we find that on the occasion of the race to the Cape with reinforcements for the Zulu War the Pretoria beat the latter ship by four hours, and consumed 10 tons of coal per day less during the whole voyage.

Corrugated furnace flues are as suited to land boilers as marine; indeed a fair proportion of the Leeds Forge Company's output is for this class of boiler, and steam users are now finding that they can reduce the number of their boilers materially, or get more power out of a certain number, simply by offering the products of combustion a surface better calculated to absorb their caloric, and which will not suffer them to glide by away into the stack, doing little or no work. The elasticity of these flues, it will be noticed, is very great; when the pressure was removed, at 550 lbs. per square inch, the flue tested on the 5th inst. went back to its original length. It would seem that there exists an action similar in a certain degree to that of a concertina; its effect in practice is to prevent any scale or sediment adhering to the outside of a corrugated flue. The moment a layer of hard incrustation exceeds an eighth of an inch in thickness it is broken off by the expansion and contraction of the corrugations at the different temperatures of the boiler. Some of these flues have been at work since Jan. 4, 1878, night and day, with very bad water, and the proprietors report that the flues are as good as the day they were put in.

## EXPERIMENTS WITH NEW EXPLOSIVES IN COAL MINING.*

The preparations used in the experiments made in the collieries belonging to the Ferdinand's Nordbahn, at Pölnisch-Ostrau, were—

1.—Peralite, a coarse-grained powder, made by Procháska and Lisch, at Buda Pest, costing about 60s. per cwt., said to consist of potash nitre, 64 per cent., charcoal, 30 per cent., and sulphide of antimony, 6 per cent.

2.—Janite, made by H. Jahn, at Peggau, a grey coarse-grained powder, containing potash nitre, 65 to 75 per cent.; sulphur, 10 per cent.; lignite, 10 to 15 per cent.; picrate of soda, 3 to 8 per cent., and chlorate of potash, 2 per cent. This is less inflammable and less violent in its action than peralite, producing a larger proportion of round coal. The cost is 59s. per cwt.

3.—Carbazotine, the invention of Cahuc and de Soulages of Toulouse, made at Dombrau, in Moravia, costing 58s. per cwt. It contains 61·04 per cent. potash nitre, 0·73 per cent. sulphate of iron, 24·65 per cent. soot and tan, and 13·58 per cent. sulphur. It is not granulated, is from 60 to 70 per cent. lighter than gunpowder, and tolerably hygroscopic, but may be dried without danger at a stove heat. Being very difficult of inflammation and quiet in action, it is exceedingly safe in use, but must be closely tamped, which can, however, be done with an iron bar.

4.—Carbon Dynamite No. III, from Mahler and Eschenbacher, of Vienna, a substance analogous to the weaker kinds of dynamite made by Nobel, containing a certain proportion of nitro-glycerine absorbed by a material which is essentially an imperfect gunpowder.

The trials were made in a seam about 13 ft. thick, in headings 6 ft. 6 in. square, the explosive being changed at every 10 ft. driven so as to ensure as much as possible uniformity in the conditions of the experiments. The proportional yield was—

| | Large coal. | Nuts. | Slack. |
|---|---|---|---|
| With dynamite No. III. .....Per cent. | 21·4 ..... | 35·6 ..... | 43·0 |
| „ carbazotine ..... | 26·3 ..... | 37·7 ..... | 36·0 |
| „ peralite..... | 19·9 ..... | 37·7 ..... | 44·4 |
| „ janite ..... | 22·9 ..... | 38·5 ..... | 38·6 |

The relative efficiency of the different materials being as regards—

| | Cost per ton of coal of explosive used. | Value per ton of coal got. |
|---|---|---|
| Carbazotine..... | 2 1-7d. ..... | 10s. 8½d. |
| Janite ..... | 2 6·8 1. ..... | 10 7 |
| Dynamite No. III..... | 2 1-60d..... | 10 4½ |
| Peralite ..... | 2½d. ..... | 10 3 |

* From JAMES FORREST'S "Abstracts of Papers in Foreign Transactions and Periodicals," for the Proceedings of the Institution of Civil Engineers.

The difference between the highest and lowest of these figures corresponds on the total output of the pits (about 160,000 tons per annum, one-half of which is sufficiently hard to require blasting) to about 2000*l.* saved in the cost of explosives, and increased value of the coal produced.

— By J. MAYER: Oesterreichische Reitschrift für Berg und Hüttenwesen.

## Registration of New Companies.

The following joint-stock companies have been duly registered:—

THE EXPRESS COUNTRY MILK COMPANY (Limited).—Capital 100,000*l.*, in shares of 5*l.* To carry on the business of a dairyman. The subscribers (who take one share each) are—G. Barham, Hampstead; J. Steed, Chalk Farm; J. Stephenson, Ware; W. W. England, 5, Bury-place; H. Lillicrup, Blackheath; E. N. Ensworth, Hammersmith; R. Barham, 33, Cannon-street.

FLORIDA LAND AND COLONISATION COMPANY (Limited).—Capital 250,000*l.*, in shares of 20*l.* To acquire a concession and carry on the business of a land and colonisation company generally. The subscribers are—W. Mackinnon, 13, Austinfriars, 250; H. S. Sanford, Florida, 1; D. Mackinnon, 7, Lothbury, 10; A. Gray, 13, Austinfrlars, 10; E. Lees, 102, Lancaster Gate, 1; J. Mackinnon, 7, Lothbury, 5; E. S. Dawes, 13, Austinfriars, 10.

TRADING AND AGRICULTURAL ASSOCIATION OF MOROCCO (Limited).—Capital 20,000*l.*, in shares of 5*l.* To carry on the business of a trading and agricultural company. The subscribers (who take one share each) are—A. Derry, 21, Great Winchester-street; H. July, 19, Great Prescott-street; H. Firmin, 3, Great Winchester-street; V. Manuel, Paris; A. Snellgrove, 10, Moorgate-street; W. Mackenzie, West Kensington; J. Messer, Balham.

HERBERT, MILLER, AND COMPANY (Limited).—Capital 25,000*l.*, in shares of 5*l.* To carry on the business of stay, corset, and belt manufacturers. The subscribers (who take one share each) are—H. Bradley, 73, Wood-street; G. S. Miller, 73, Wood-street; W. B. Hill, Stoke Newington; J. Mumford, 8, Catherine-court; E. E. Johnson, 110, Cannon-street; W. H. Longman, Highgate; J. R. Longman, 17, Gresham-street.

THE PORTSMOUTH AND SOUTHSEA AQUARIUM COMPANY (Limited).—Capital 40,000*l.*, in shares of 5*l.* To erect and open for public and other entertainments an aquarium. The subscribers (who take one share each) are—W. J. Tuck, Sandport; W. R. B. Welsh, Portsmouth; G. Whitehall, Portsea; R. W. Beale, Portsmouth; M. G. Hamblin, Portsmouth; S. Parr, Southsea; J. W. Boughton, Southsea.

THE CLAREMONT PARK HYDROPATHIC COMPANY, BLACKPOOL (Limited).—Capital 50,000*l.*, in shares of 5*l.* To acquire certain buildings in Blackpool and neighbourhood, for the purpose of carrying on hydropathic establishments. The subscribers are—C. Meredith, Manchester, 50; J. Parrott, Salford, 50; R. Kilner, Manchester, 20; T. Hyde, Manchester, 50; S. Jackson, Bury, 50; R. Howorth, Rochdale, 45; E. Siller, Blackpool, 45.

THE SOUTH ESSEX CONSERVATIVE LAND AND INVESTMENT COMPANY (Limited).—Capital 50,000*l.*, in shares of 5*l.* To acquire estates, and carry on the business of a land company. The subscribers are—W. Johnson, 85, Gracechurch-street, 5; J. Bressey, 70, Bishopsgate-street Within, 5; J. C. Stockton, Snaresbrook, 5; T. G. Venables, Wanstead, 5; W. Norman, Wanstead, 1; C. Ganders, Chiswell, 5; E. S. Morris, 167, Fenchurch-street, 2.

SKURRAY'S EDGE TOOL COMPANY (Limited).—Capital 10,000*l.*, in shares of 5*l.* To acquire and carry on a manufacturing business at Chippenham. The subscribers (who take two shares each) are—J. C. Skurray, Chippenham; E. J. Howeld, Chippenham; F. Skurray, Reading; G. Hatherston, Chippenham; W. Frampton, Benson; J. Lane, Chippenham; H. R. Cooper, Preston.

THE AGRICULTURAL PRESS COMPANY (Limited).—Capital 10,000*l.*, in shares of 10*l.* To publish books, newspapers, periodicals, &c., in connection with agriculture. The subscribers (who take one share each) are—J. Meston, Aberdeen; W. Watt, Aberdeen; J. Greig, Aberdeen; W. A. Hunter, 6, Pump-court; T. A. Spalding, 6, Pump-court; J. Courtnay, 3, Plowden Buildings; W. E. Bear, 265, Strand.

THE METROPOLITAN STEAM BOAT COMPANY (Limited).—Capital 100,000*l.*, in shares of 5*l.* To purchase, build, and use steam and other vessels. The subscribers (who take one share each) are—G. Puckle, 20, Endsleigh Gardens; R. J. Laing, Upper Clapton; E. McBarker, 11, Austinfriars; H. R. Stewart, Lewisham; R. C. Stenson, 40, Millman-street; J. Bruton, Old Ford-road; R. Rishop, 12, Vauxhall Bridge-road.

ROTHERWOOD IRON AND STEEL COMPANY (Limited).—Capital 38,000*l.*, in shares of 20*l.* To acquire and work certain patents and carry on the business of an iron and steel manufacturing company. The subscribers (who take one share each) are—R. Smith, Manchester; C. C. Dunkerley, Manchester; J. Betts, Rotherham; J. Simpson, Manchester; H. C. Simpson, Manchester; W. Warburton Bowden; J. McSmith, 14, The Boltons.

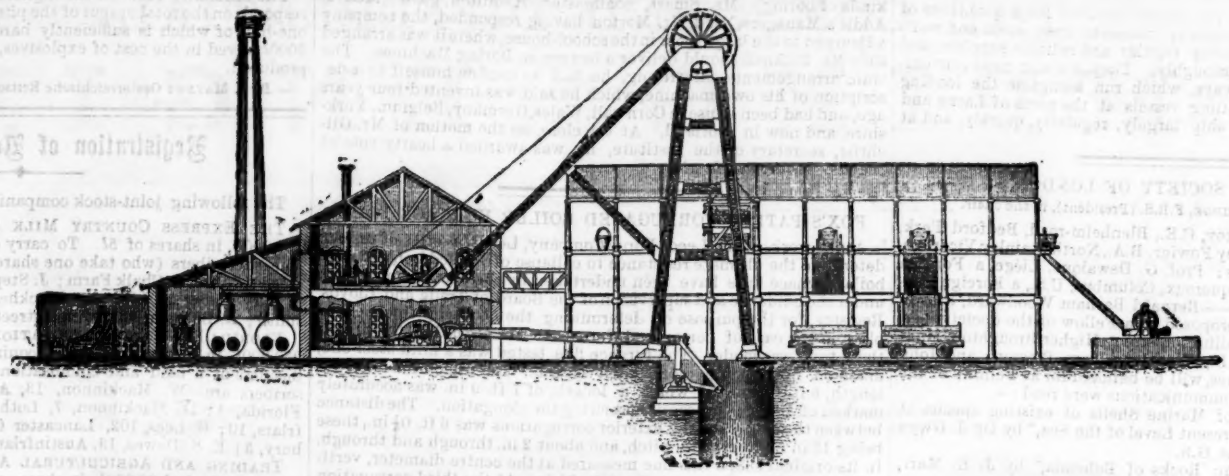
THE WILLIAMS BULKELEY ARMS HOTEL COMPANY (Limited).—Capital 10,000*l.*, in shares of 100*l.* To take over and carry on an hotel business at Beaumaris. The subscribers are—H. Platt, Bangor, 1; J. L. H. Lewis, Beaumaris, 1; W. Dew, Bangor, 2; W. A. Darbishire, Penygroves, 1; J. R. Roberts, Beaumaris, 2; A. Laurie, Beaumaris, 1; S. R. Dew, Llandudno, 1.

THE BLACKFORD BRIDGE LIBERAL CLUB (Limited).—Capital 200*l.*, in shares of 1*l.* To acquire land in Lancashire for the erection of a club house. The subscribers are—H. Dewhurst, Bury, 1; A. Shepherd, Bury, 5; E. Barlow, Blackford, 5; W. Burry, Barlow Fold, 5; J. Burry, Barlow Fold, 5; T. Ashworth, Blackford, 2; J. Duckworth, Bury, 5.

THE LONDON SUBURBAN HOUSE PROPERTY COMPANY (Limited).—Capital 100,000*l.*, in shares of 5*l.* To purchase or otherwise acquire lands for the purpose of selling or letting the same. The subscribers (who take one share each) are—L. Bishop, Wandsworth; J. Horrocks, 17, Philpott-lane; R. Gordon, New Malden; S. B. Noble, 4, Hanover-square; P. J. Lowry, 28, Budge-row; F. Burford, Islington; J. E. Costello, 115, Cannon-street.

PRESERVING STEAM BOILERS.—The invention of Mr. J. Baker, of Southampton Buildings, consists of a composition for preserving metal surfaces from oxidation, and is particularly applicable for coating or covering the interior of steam-boilers, as it not only prevents oxidation of the plates when the boiler is not in use, but also prevents the said plates from becoming incrustated. The composition may also be made a non-conductor of heat, so that the boiler may be coated therewith where required, and thus dispense with the necessity of "lagging" the same. According to this invention the composition is composed of a mixture of asphalte, varnish, and cement (by preference hydraulic cement), and when required to make the composition a non-conductor of heat he adds granulated cork. He has found that equal proportions of the above ingredients answer well, but he does not intend to limit himself to these proportions, as the same may be varied according to circumstances. In order that the coating may be smooth he adds to the above mixture an equal proportion of sand (by preference sea sand). The above composition is spread over the surface to be covered in an even coating, say ¼ in. in thickness; this may be done by means of wooden floats, and where rivet heads or other inequalities occur it may be daubed on thickly by means of a brush. The above composition will pe found applicable for coating a variety of surfaces besides boilers, such as tubular bridges, gas and water mains, for example.

HOLLOWAY'S PILLS AND OINTMENT.—When the appetite fails and a sense of chilliness and nausea is experienced Nature points out that she requires assistance in throwing off some deleterious influence. An early resort to these remedies will soon have the desired effect, and often avert an imminent illness. Hepatic congestions, flatulency, colic, and those very distressing flying pains in the limbs and back so indicative of cold having been taken, are rapidly removed by a few doses of these purifying pills in conjunction with the local infriction of the ungnent. As summer advances such symptoms as these should never be neglected, as serious illness often ensues if the liver, kidneys, and skin do not act freely. Delay is dangerous.



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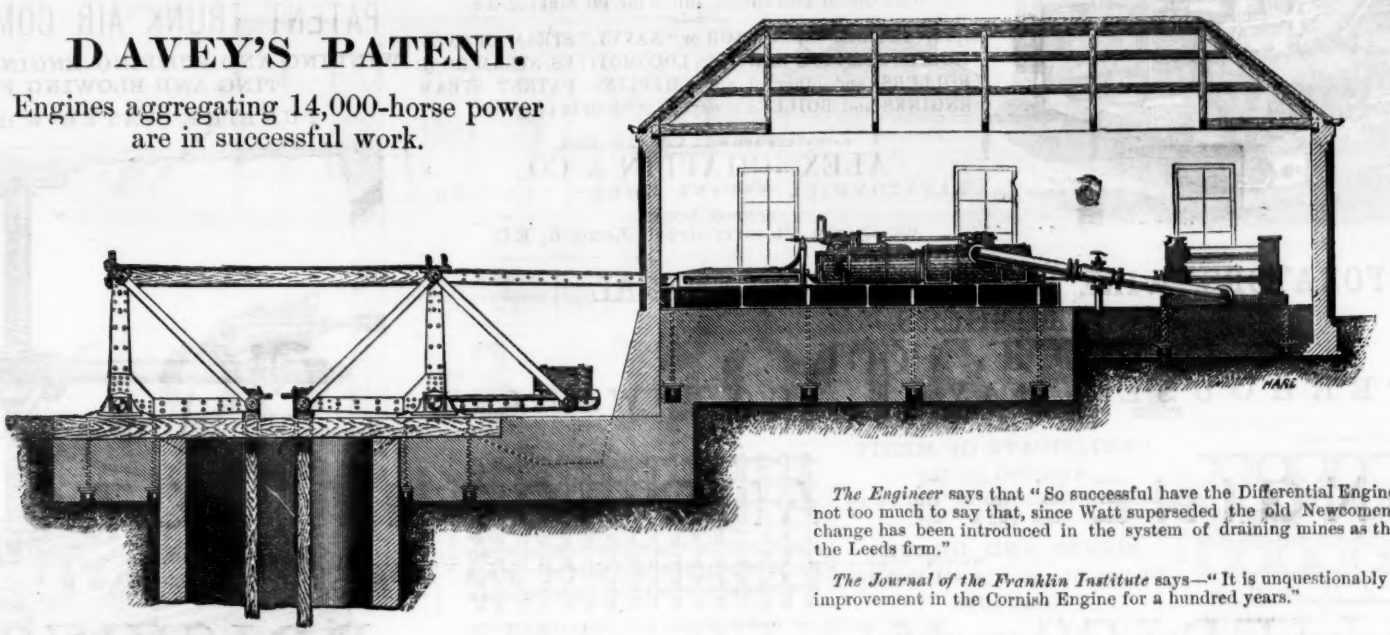

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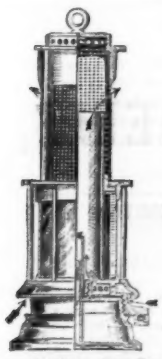

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**SAFETY LAMP** AND **GAUZE MANUFACTORY,**
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Makers of Williamson's Double Safety Lamp
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Medal—For Improved Invention—London, Kensington, 1874.
Ditto —Excellence of Workmanship—Wrexham, 1876.

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**MacADAM'S VARIABLE TURBINE.**

This Wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and yet work with equal efficiency through all variations of quantity down to a fifth, or even less if required. It is easily coupled to a steam-engine, and in this way always assists it by whatever amount of power the water is capable of giving, and therefore saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-water, so that no part of the fall is lost, and the motion of the Wheel is not affected by floods or back-water.

References to places where it is at work will be given on application to—

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ACCIDENTS CAUSE LOSS OF TIME
And may be provided against by a Policy of the
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WILLIAM J. VIAN, Secretary

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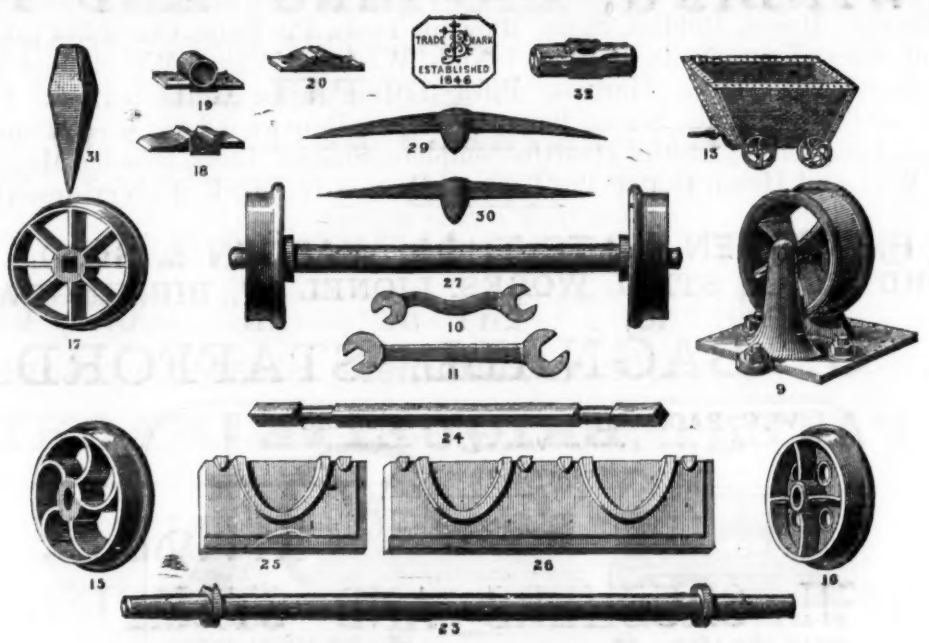


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PRICES ON APPLICATION.

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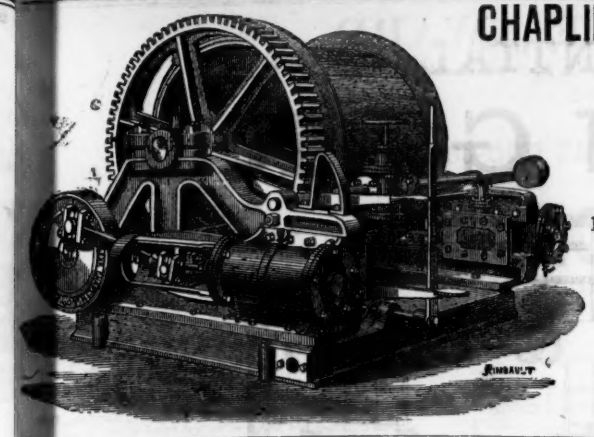
PRICE LIST ON APPLICATION.



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On Carriage and Wheels,

With One or Two Drums, suited for Pit Sinking, &c.

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Millimeter holes perforated in sheet-copper, brass, IRON, steel, and zinc.

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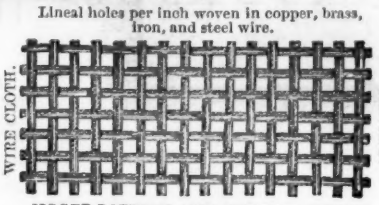
Lineal holes per inch woven in copper, brass, iron, and steel wire.



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Strong web, the cross wires slightly bent. SIEVING.

JIGGER-BOTTOMS AND CRUSHER SIEVES.

Manufacturers of Stamps-Grates, Sieves, and Riddles, for Mining and other purposes, by Self-acting Steam Machinery.

SPECIALITY.—Thick Copper, Brass, Zinc, and IRON Perforations, Classifying-Sieves, Pierced Pulveriser and Stamps-Grates up to 289 holes to the square inch, Copper-bottom "Tinsifts" and Hair-bottom "Delewering-serges."

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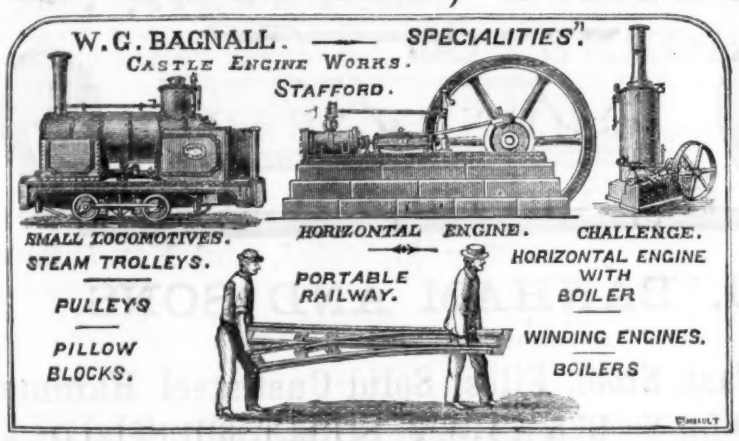


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NEW SYSTEM—CAN BE RUNG AT ANY PART OF THE ROAD. Cheap, safe, and reliable. Efficiency guaranteed. LINES OF TELEGRAPH erected and maintained. LIGHTNING CONDUCTORS, &c.

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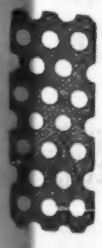

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Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper

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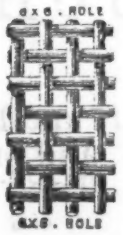


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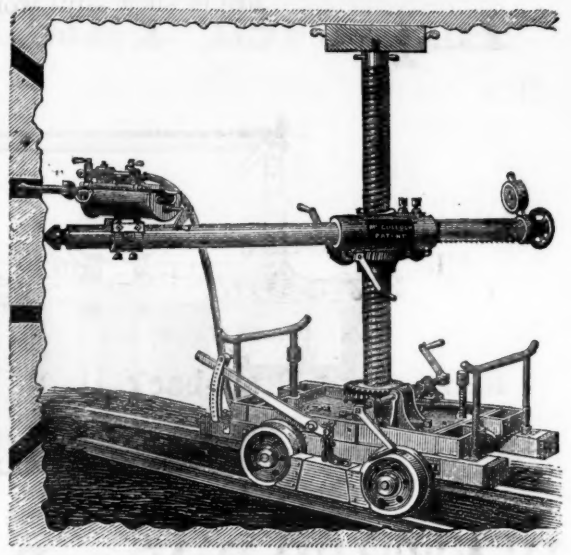

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The Machines are complete in themselves, and require no masonry or any other foundation, and can be driven by either steam or water power.

Estimates and full particulars on application, as above.

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IMPROVED CRUSHING MILL, combining the "Marsden Patent Stone Breaker" with the "Improved Cornish Crusher," reducing the hardest rock to sand in one operation, and delivering the same in a classified state to their improved air-cushioned jiggers automatically, and also delivering the slimes automatically to the slime dressers, effecting an economy of 90 per cent. of labour and 90 per cent. of the ore wasted under the old system, and is at the same time applicable to all kinds of ore, including gold washing, refining, &c.

Improved Air-Cushioned Piston Jiggers and Vanning and Percussion Tables supplied, with all kinds of machinery, &c.; Classifiers and Slime Dressers.

Inspection of Mines at home and abroad. French and German spoken.

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Lists and Samples on application.

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**Stones broken equal, and Ores better, than by hand, at one-tenth the cost.**

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OVER **2750** IN USE.

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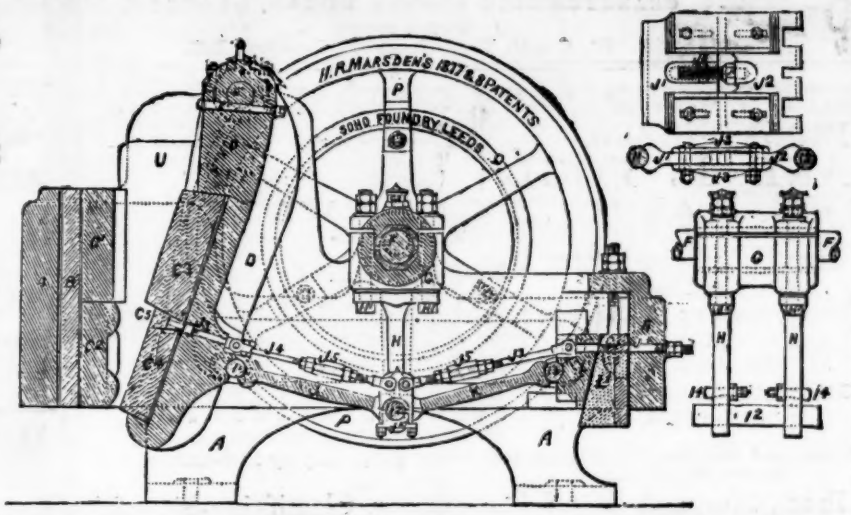


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We are, yours faithfully,
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St. John del Rey Mining Company (Limite
A SAVING OF FIFTY-FIVE HANDS BY THE U
ONE MEDIUM-SIZED MACHINE.

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GREATLY REDUCED PRICES ON APPLICATION.

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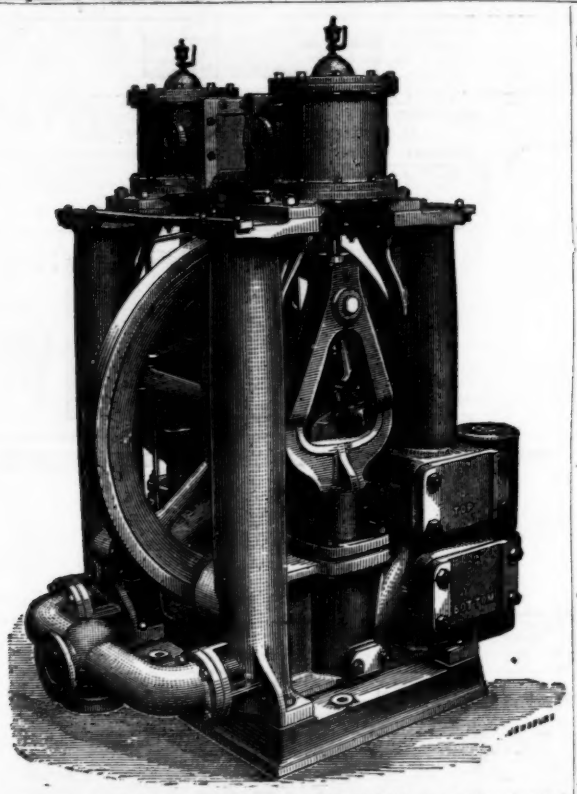

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Simple, strong, and giving most excellent results, and
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